ELECTRICAL TIMES

THURSDAY
24 SEPT. 1953
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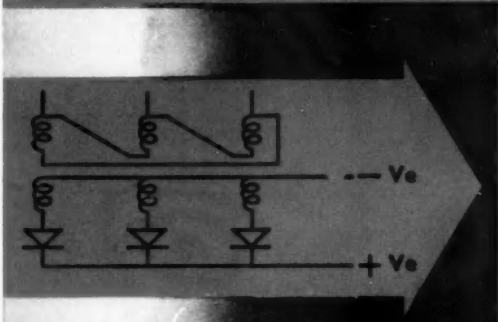

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INPUT 400 VOLTS 3 PHASE
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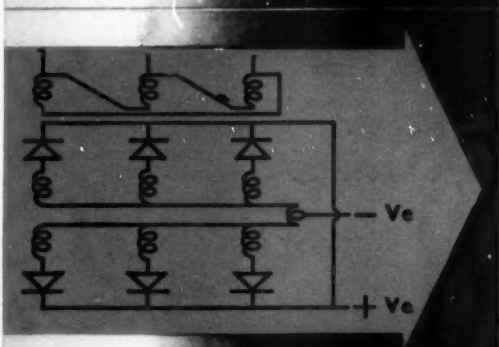

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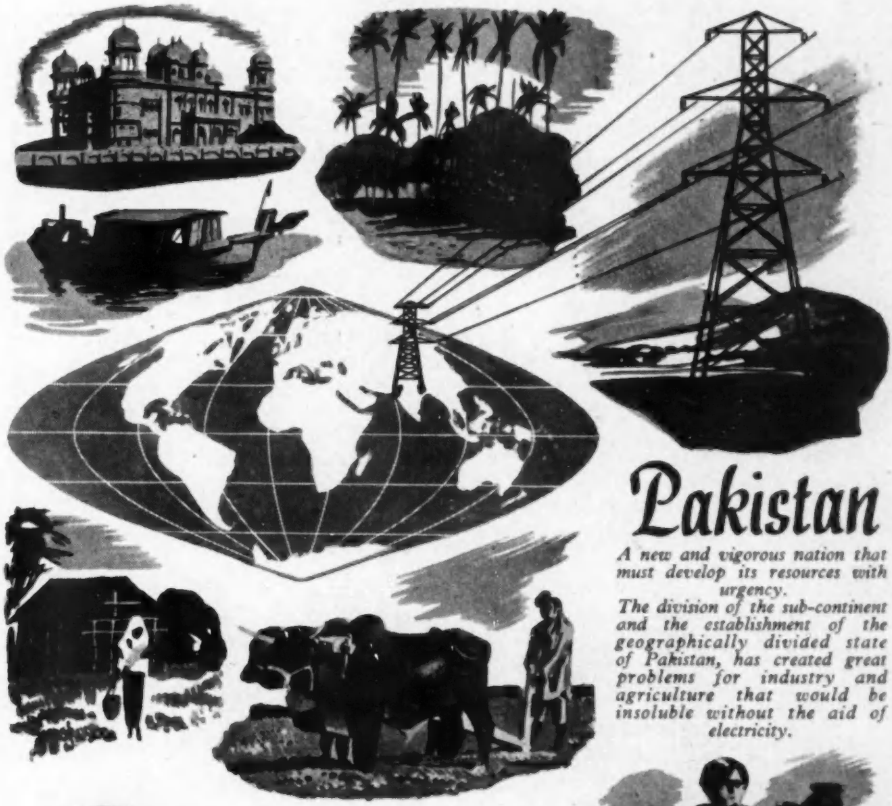

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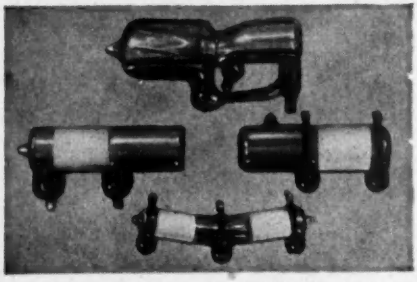

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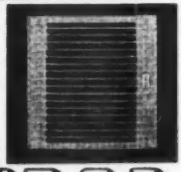

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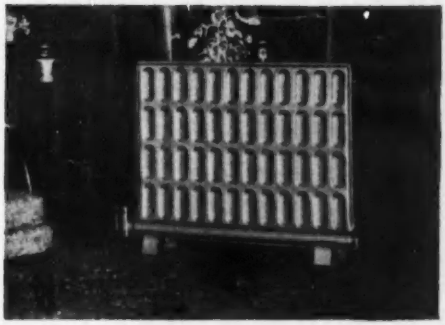

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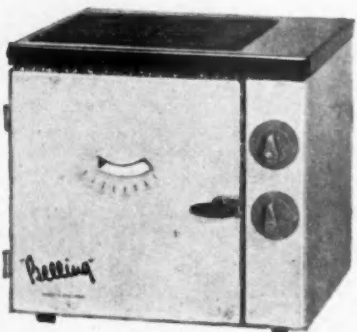

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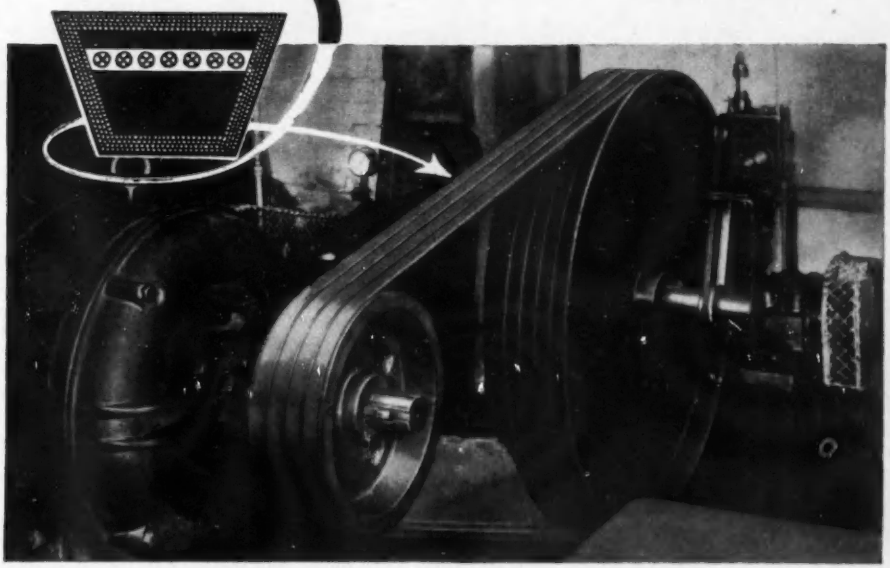

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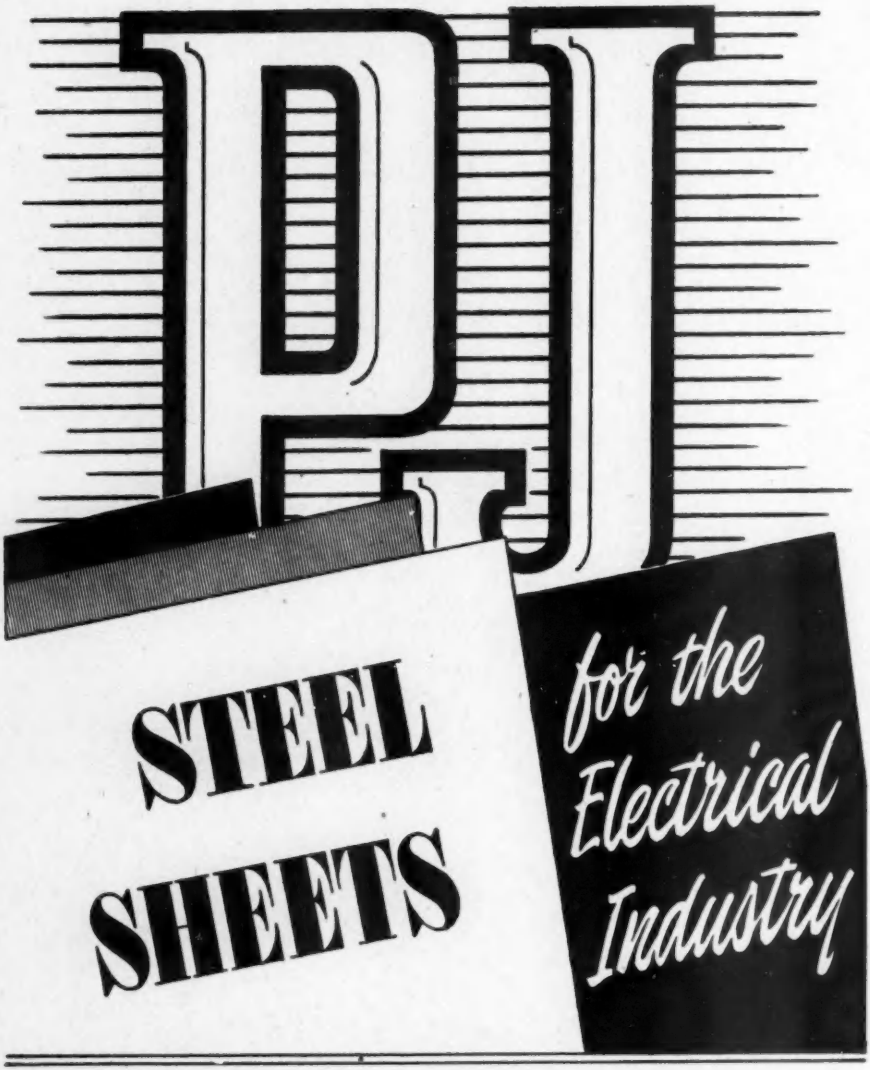

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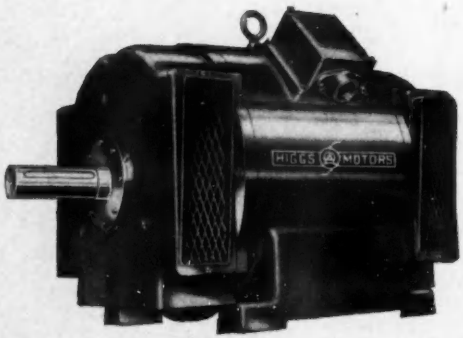

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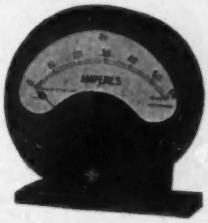
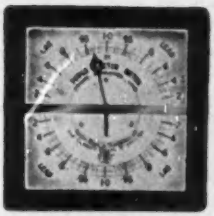


Controller Ammeter

Induction Wattmeter Type "SQB"



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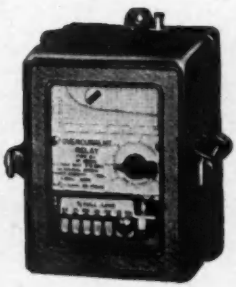
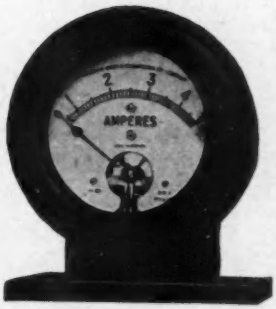


Inverse Overcurrent Relay



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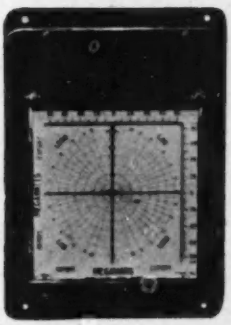

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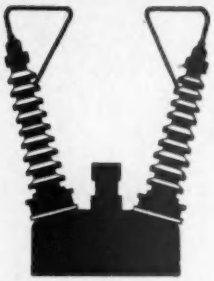

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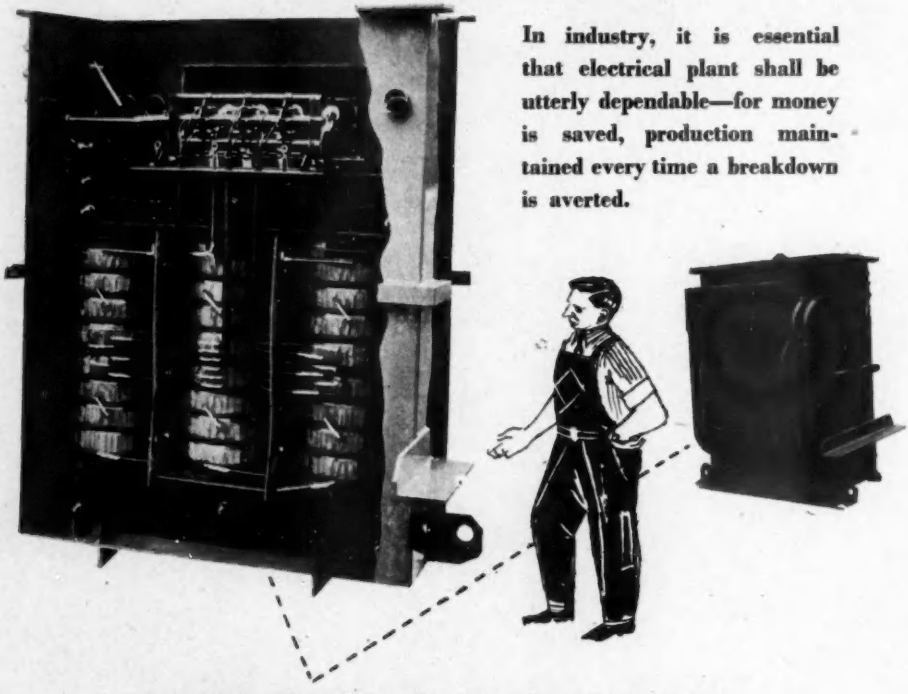

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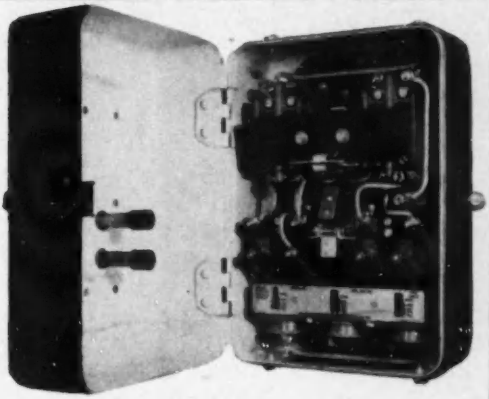

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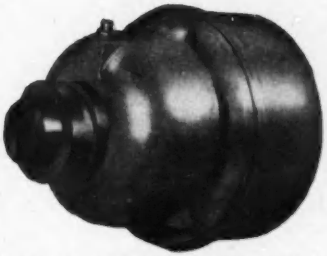

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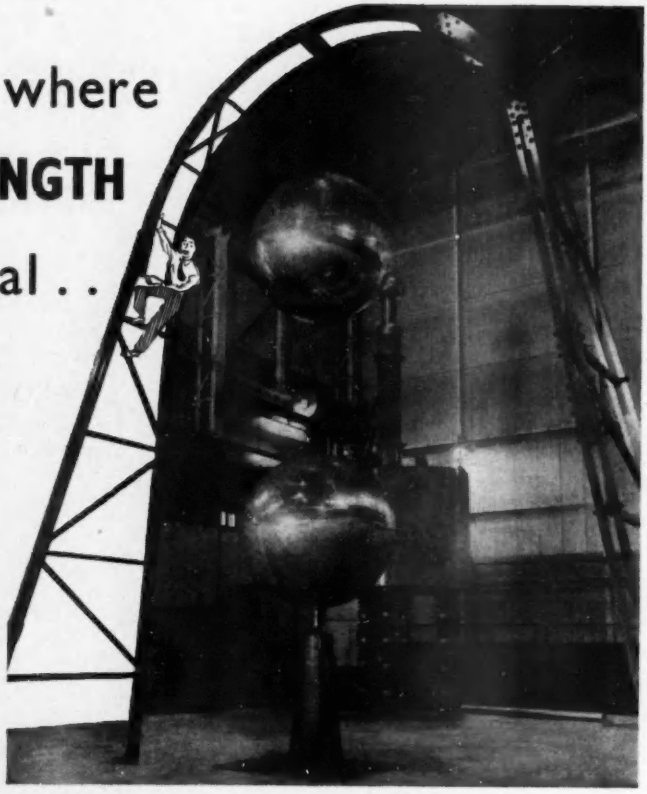

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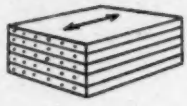

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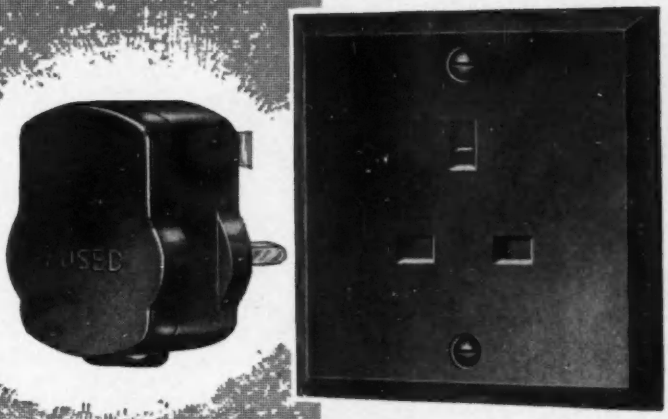

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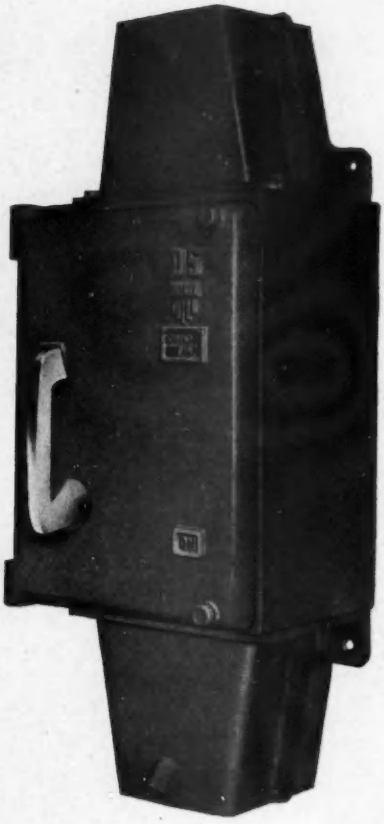

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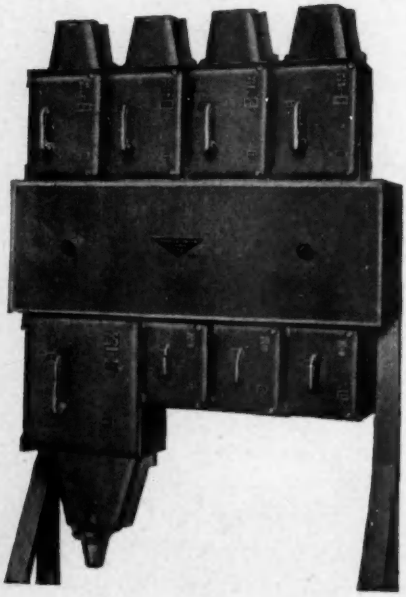

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Here are features that really mean something to the housewife — features that will help you to sell. The 'ENGLISH ELECTRIC' Auto-control Panel answers the plea of millions of women for a cooker that will free them from the ties of cooking. With the aid of the Automatic Timer, they can set the oven to be switched on and off at any time they require, so that it will cook a complete meal in their absence. Add to this the other features shown opposite, together with the fact that special care has been taken to ensure really easy servicing, and you can see for yourself that this new cooker is a winner.

This Automatic Cooker will retail at £55 and the usual H.P. terms will be available to your customers. Subject to usual trade terms.

P.S.

THE NEW

'ENGLISH ELECTRIC' AUTOMATIC COOKER

WILL BE WIDELY ADVERTISED WITH A BIG

PRESS CAMPAIGN, DEALER CO-OPERATIVE

ADVERTISING AND COLOURFUL POINT-OF-SALE

MATERIAL

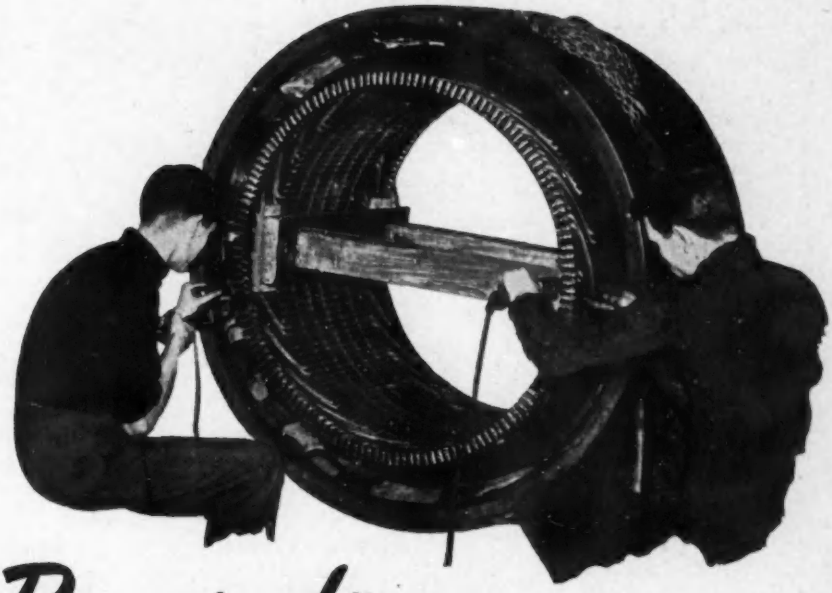
A COOKERY BOOK, BEAUTIFULLY ILLUSTRATED

IN FULL COLOUR AND CONTAINING MORE

THAN 400 RECIPES IS PROVIDED FREE

WITH EVERY COOKER

The ENGLISH ELECTRIC Company Limited
Domestic Appliance Division, East Lancashire Road, Liverpool 10



Re-winding

We may not be Britain's largest electrical and mechanical repairers (we don't know), but we do have:—

Over 30 years' experience.

A staff of over 150 to give you speedy and efficient service.

A design department under the supervision of Chartered Electrical Engineers.

A large machine shop equipped with a comprehensive range of very modern machine tools.

An inspection and test department approved by the A.I.D.

Remember then, for a quick, efficient service . . .

GRAngewood 4003 (4 lines)

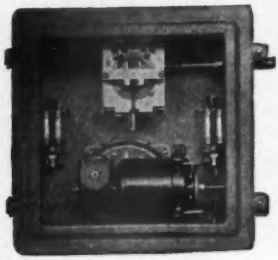
BROWNING'S ELECTRIC CO. LTD.

BOLEYN CASTLE · GREEN STREET · UPTON PARK · LONDON · E.13

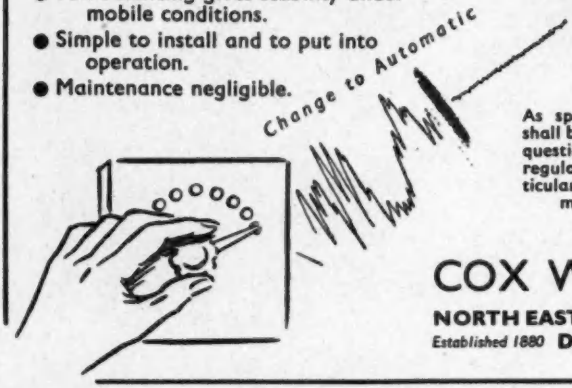
TELEPHONE: GRANGEWOOD 4003 (4 lines)

B

COXPAR *AUTOMATIC VOLTAGE* **REGULATOR**



- Suitable for large A.C. or D.C. machines.
- Possesses extreme sensitivity.
- Accuracy to within ± 1%.
- Electrical interlocks and limit switches provided.
- Full balancing gives stability under mobile conditions.
- Simple to install and to put into operation.
- Maintenance negligible.



As specialists in the field we shall be pleased to advise on the question of automatic voltage regulation if we may receive particulars of your specific requirements for any loading.

COX WALKERS LTD.
NORTH EASTERN ELECTRIC WORKS
Established 1880 DARLINGTON *Phone 2387*

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Electrical Insulation

It will pay you to send us your enquiries for all types of Micanite Insulations.

We can assist you by maintaining a High Standard of Quality at Competitive Prices.

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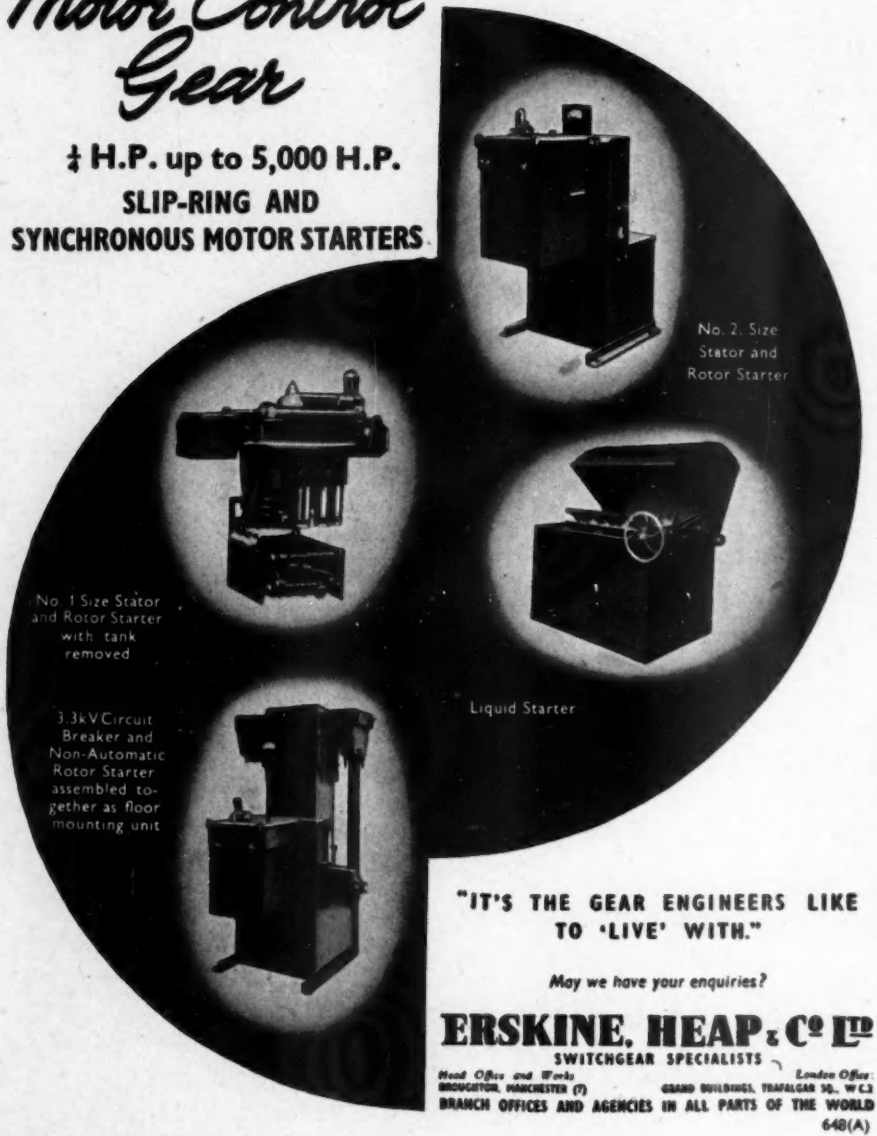
"ERSKINE HEAP"

Motor Control Gear

¼ H.P. up to 5,000 H.P.

SLIP-RING AND SYNCHRONOUS MOTOR STARTERS



No. 2. Size Stator and Rotor Starter

No. 1 Size Stator and Rotor Starter with tank removed

Liquid Starter

3.3kV Circuit Breaker and Non-Automatic Rotor Starter assembled together as floor mounting unit

"IT'S THE GEAR ENGINEERS LIKE TO 'LIVE' WITH."

May we have your enquiries?

ERSKINE, HEAP & Co Ltd

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A new VYBAK compound — VN 350

to meet the new BS 2004 for PVC Cables

VN 350—a direct descendant from the well-known VN 306—has been specially developed to meet the proposed British Standard "for PVC insulated cables and flexible cords, for electric power and lighting up to 250 volts."

Now available in production quantities

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FLUORESCENT LIGHTING

CONTROL UNITS

HIGH POWER FACTOR
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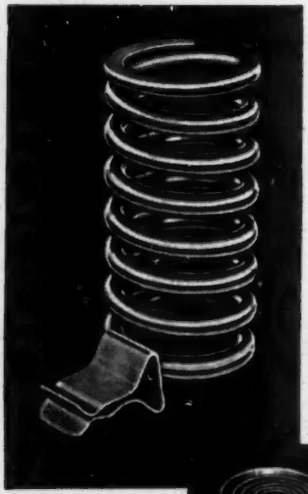
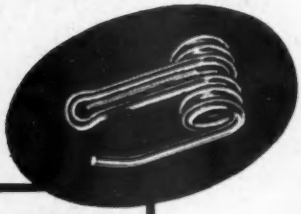


FINE · SPRINGS

LAWSON springs take many forms, and are made in almost every metal and finish. Only the quality is restricted—there are no variations from the strict LAWSON standard.

The best, without exception



by

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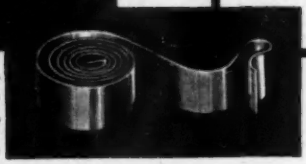
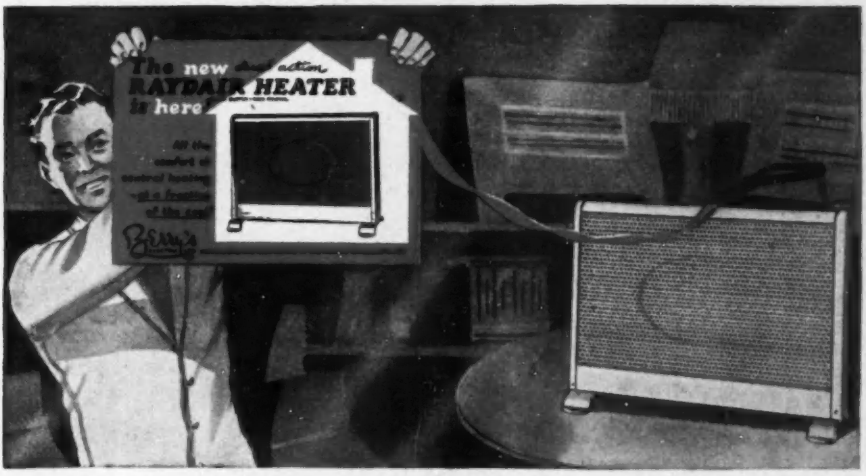


Send for our latest leaflet, and particulars of LAWSON service

CATON STREET WORKS
DRAKE ST., ROCHDALE
Telephone: ROCHDALE 2351



Got YOUR RAYDAIR display taped?

National advertising for the RAYDAIR HEATER is beginning! Within two weeks *twenty-four and a half million* people will have seen the striking advertisements which direct them to *your* window.

Don't let prospective customers lose interest! *Double* the force of the advertising by making full use of the arresting RAYDAIR window display material.

Let them see the RAYDAIR HEATER

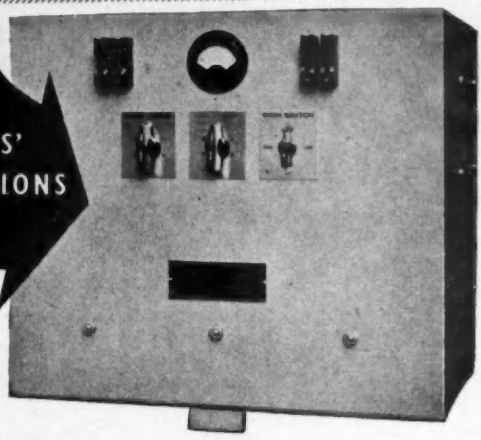
REGD. DESIGN, PATS. PENDING

A last-minute reminder from Berry's ELECTRIC LTD

TOUCHBUTTON HOUSE, NEWMAN ST., LONDON, W.1. TEL: MUS 6800

THE BATTERY CHARGERS
that conform to BATTERY MANUFACTURERS' SPECIFICATIONS

THE BC.6 RANGE
OUTPUT 850 WATTS



Price £60.11.0

The BC. 6 is the charger for both garage and industrial purposes. It is mechanically sound, robust, and static in operation. Electrically it conforms to battery manufacturers' specifications. Resistance ballast is provided in the transformer primary circuit to smooth out the effect of mains fluctuations and to stabilise the charging current. Two six-position tapping switches (four-position when the output current exceeds 12 amps.) one coarse and one fine in the transformer secondary, control the charging current, eliminate wasteful resistances and reduce power consumption to a minimum.

Five models are available in this range giving varying rates of charge, 12 cells at 20 amps. and 40 cells at 8 amps. being typical examples.

For further details of

WESTINGHOUSE
WESTALITE
BATTERY CHARGERS

write for publication M.R.13 to

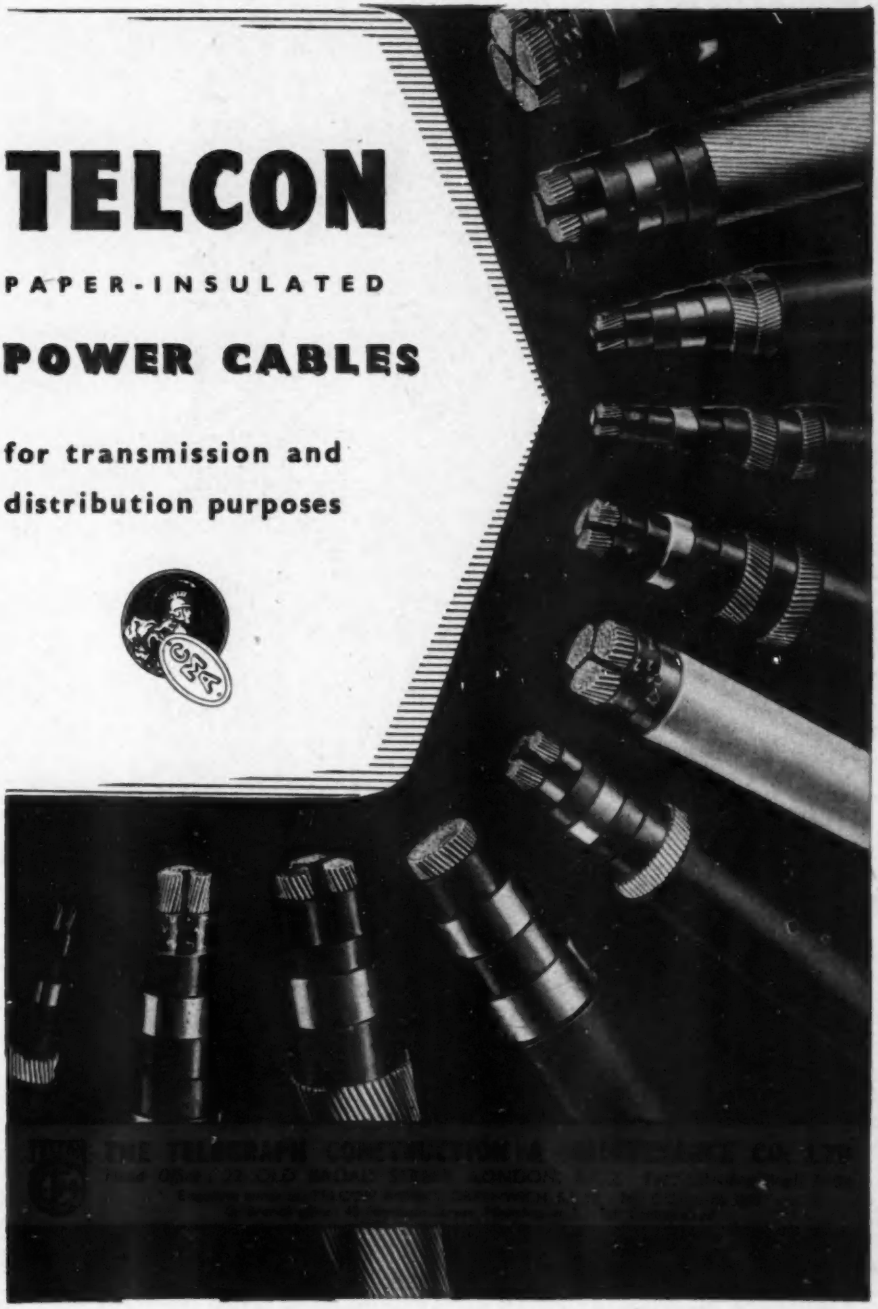
Dept. E.T.20
WESTINGHOUSE BRAKE & SIGNAL CO., LTD.
82 York Way, King's Cross, London N.1

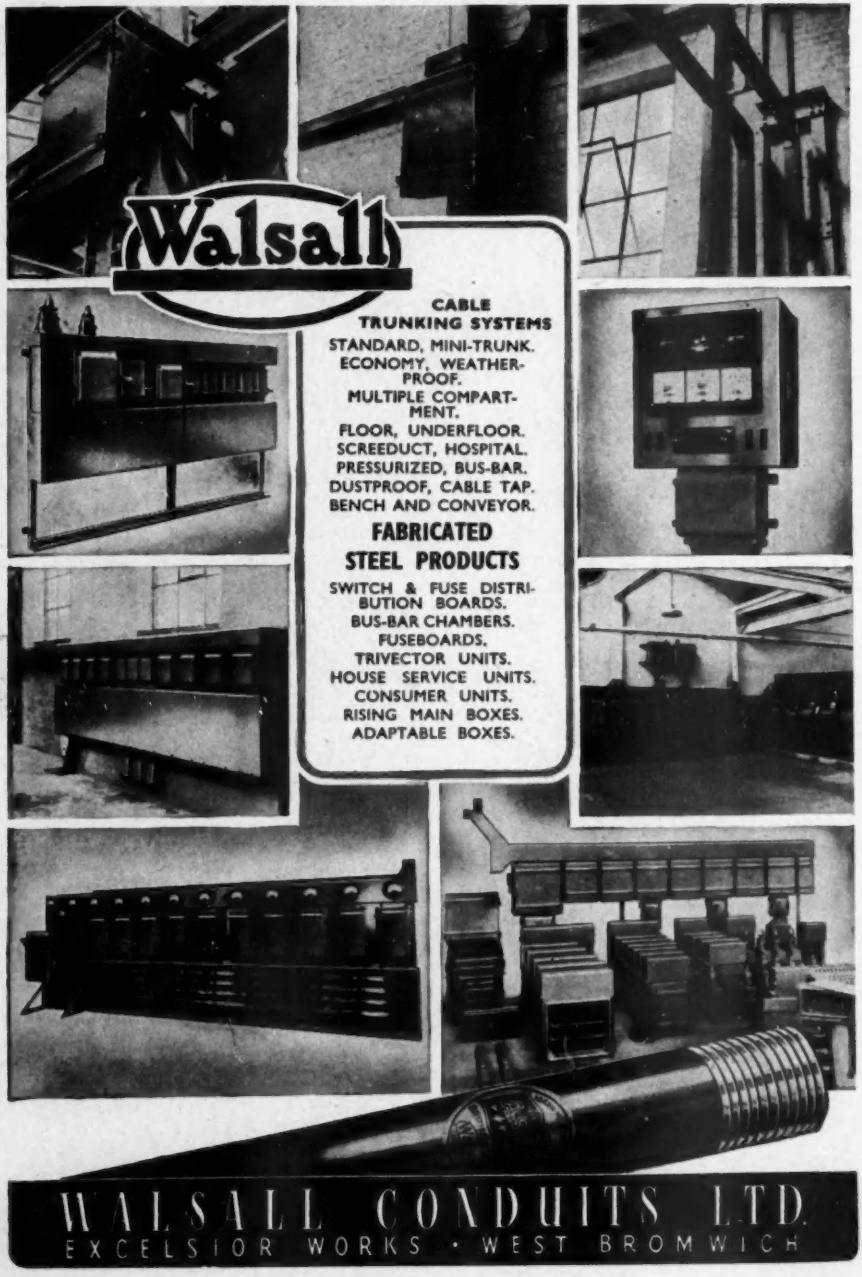
TELCON

PAPER-INSULATED

POWER CABLES

for transmission and distribution purposes

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CABLE
TRUNKING SYSTEMS
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Many of the leading industrial concerns, County Councils, Public Works Departments and Electricity Boards, etc. specify and fit "Volex" Plastic Shades because they know that for most efficient lighting, pleasing appearance and robust design they fulfil every requirement.

Send for illustrated leaflet giving full particulars of wide range.

"VENTICAL" (Regd.) PATTERNS

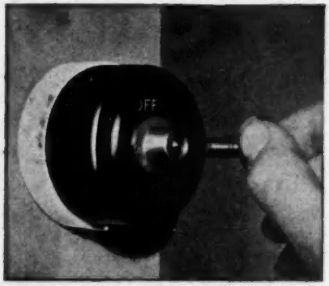
Separate ventilated gallery. Provides a high degree of illumination without glare and widely used by leading authorities.

VOLEX ELECTRICAL PRODUCTS LTD

SALFORD 6

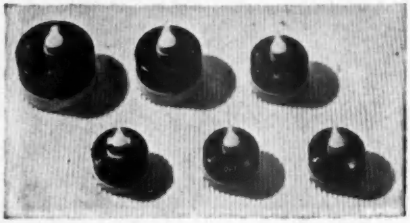
Telephone: PENdleton 4373 Telegrams: "VOLEXPROD" Salford 6

TOK ROTARY SWITCHES *STILL THE BEST*



When you travel by British Railways (Southern Region) remember that TOK switches have been used on all their rolling stock since this section was electrified. The 600 volt Barrier Type has stood the test of time.

YOU can rely on TOK



There are some controls involving Rotary switches where it is desirable that only authorised persons should be able to operate them, and it is now possible to obtain all the TOK *non-reciprocating* switches fitted for key operation.

TOK
ELECTRICAL & INDUSTRIAL MECHANISMS LTD
(Associate of S. Davall & Sons Ltd.)

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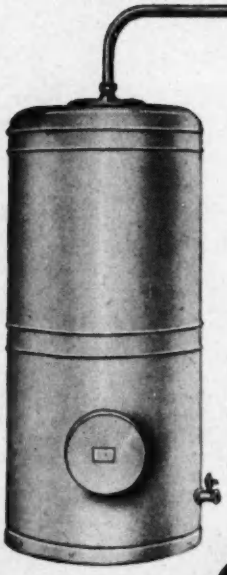
CLERKENWELL, LONDON, E.C.1
Phone: Clerkenwell 2917



Wherever large quantities of hot water are required — install a "Dunlow" Electric Storage Tank

Heavy gauge copper construction, lagging protected by large steel casing or suitable for lagging on site. Kilowatt loading to meet requirements

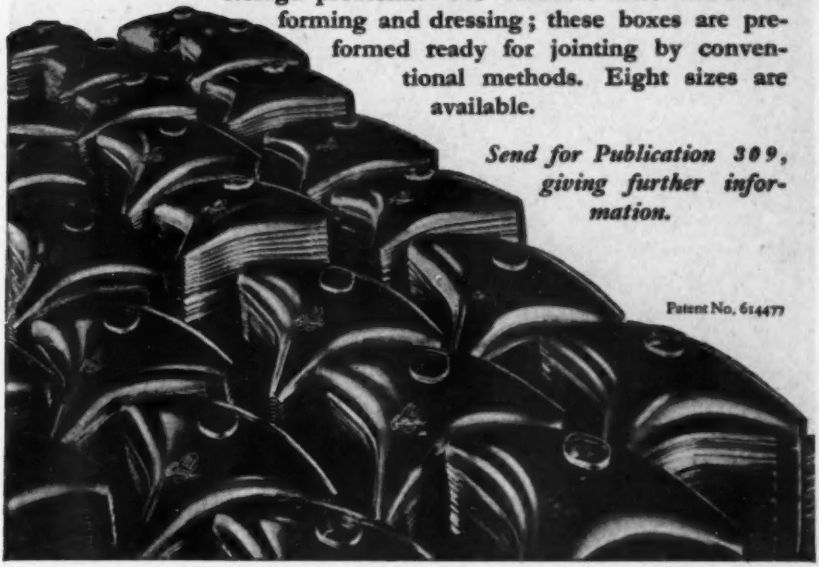
DUNCAN LOW LIMITED
293 Bell Street, Glasgow C.4

Dunlow

PRESSED COPPER SERVICE BOXES

Consider the benefits obtained by using BICC Pressed Copper Service Boxes. With lead at its present high price, the purchase of COPPER boxes shows an *immediate* saving. Moreover they are strong, lightweight and easily stacked, thus simplifying transport and storage problems. No valuable time wasted in forming and dressing; these boxes are pre-formed ready for jointing by conventional methods. Eight sizes are available.

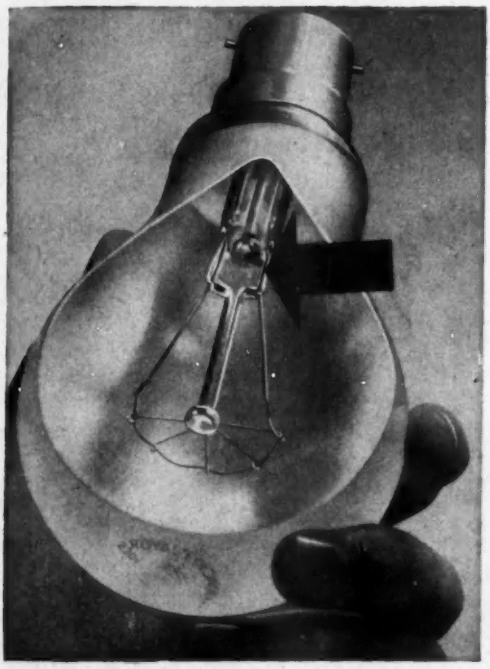
Send for Publication 309, giving further information.



Patent No. 614477

BRITISH INSULATED CALLENDER'S CABLES LIMITED
21 BLOOMSBURY STREET, LONDON, W.C.1

Nothing left to chance...



COPPER CLAD

To secure a gas tight seal at the point where the lead wires pass through the glass envelope of Royal "Ediswan" Lamps a special wire known as Copper-Clad is used. This seal must remain gas tight over the range of temperature from cold to the highest value which the lamp attains when alight.

Copper Clad, made by a very specialised technique, consists of two metals hermetically bonded in such proportions that they will expand and contract at the same rate as the glass. This property together with the specially prepared surface, ensures that a perfect metal-to-glass seal is made.

This is but one example of the intricate operations in the manufacture of Royal "Ediswan" Lamps, calling for the highest degree of technical skill and the utmost care and precision. Nothing is left to chance — *only the finest materials are used and there is strict control at each stage of manufacture.*

BY APPOINTMENT

ROYAL "EDISWAN" LAMPS

The Edison Swan Electric Co. Ltd., 155 Charing Cross Road, London, W.C.2

Member of the A.E.I. Group of Companies

L174

NARROWING the GAP...

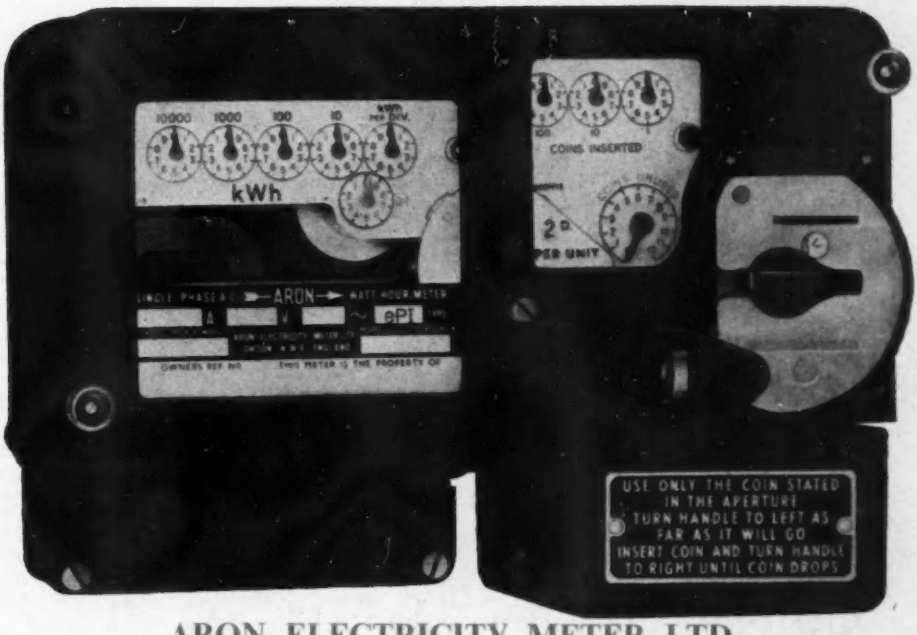
The excellence of the Aron Type ePI Prepayment Meter lies in its complete economic and operational suitability for its purpose.

It possesses a remarkable and unequalled range of advantageous characteristics, including:—

- A perfectly simple rate change facility, whereby the rate can be changed in a moment on site. Further, the rate change is in Price-per-Unit steps, with a clear indication of the operating price and also of the money in credit.
- A unique double contact switch, which can take and break the maximum load without failure, over the whole life of the meter.
- Reliable and long established meter element (eI) and prepayment mechanism (eP).
- All-insulated housing with double barrier insulation to coining unit.

These features yield a substantial saving in the cost of testing, installation, rate changing, maintenance and ultimate servicing.

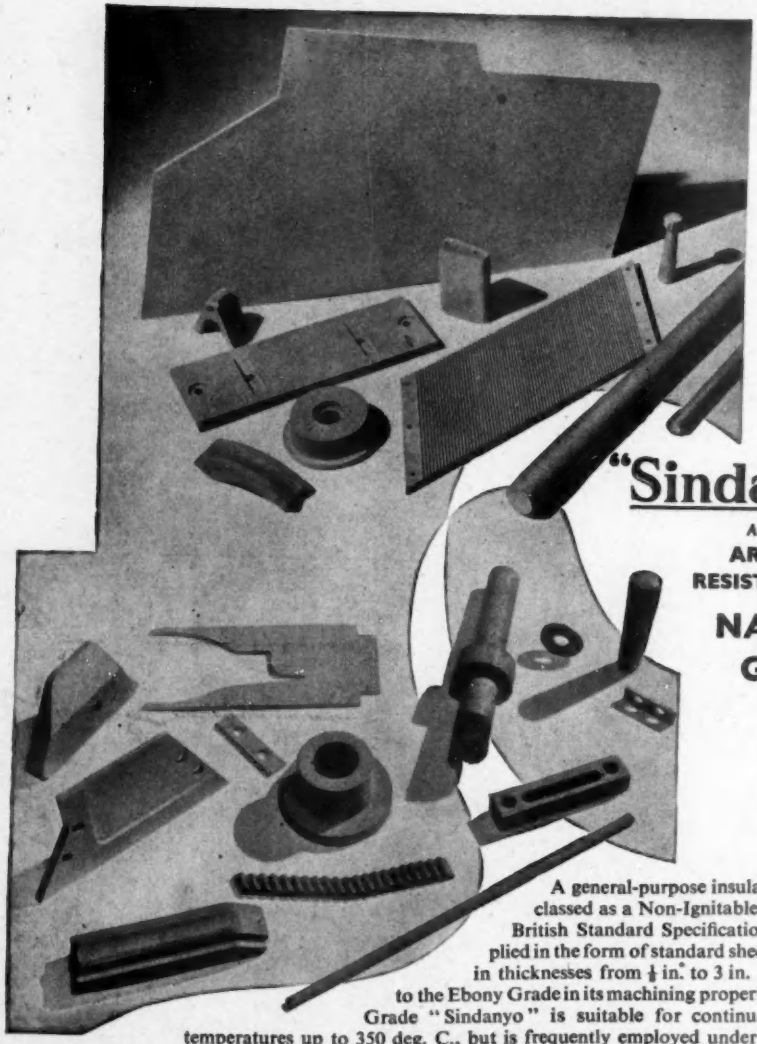
The ePI narrows the gap between the running cost of the prepayment meter and the quarterly credit meter and makes possible the economic collection of revenue from a large body of consumers, who value the special facility and service of the prepayment meter.



ARON ELECTRICITY METER LTD.

72 SALUSBURY ROAD · LONDON N.W.6

Telephone · Maida Vale 0182-0188



"SindanyO"

Asbestos Electric

ARC & HEAT RESISTING BOARDS

NATURAL GRADE

A general-purpose insulating material classed as a Non-Ignitable Board under British Standard Specification 737. Supplied in the form of standard sheets 4 ft. × 3 ft. in thicknesses from ¼ in. to 3 in. It is similar to the Ebony Grade in its machining properties. Natural Grade "Sindanyo" is suitable for continuous working temperatures up to 350 deg. C., but is frequently employed under more severe conditions of temperature under compression loading or where it may be unstressed mechanically. Natural Grade "Sindanyo" may also be treated so as to resist moisture absorption and to improve its electrical characteristics. Colour: Grey.

"Sindanyo" Boards, Ebony Grade are available for electrical insulating purposes.

TURNERS ASBESTOS CEMENT CO LTD

A MEMBER OF THE TURNER & NEWALL ORGANISATION

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S.7.

THE *Norwich* HERITAGE . . .

* *MADDERMARKET THEATRE. This well-known theatre takes its name through being on the site of an ancient market where madder—a species of plant used for dyeing—was sold.*

With a stage closely resembling those of the (first) Elizabethan era, this leading playhouse is world-renowned for the quality of its productions.

QUALITY in production has always been the tradition of Heatrae.

As an example, we feature the famous Heatrae FB. cistern-type Electric Water Heater—a most reliable performer in keeping with our tradition.

Here is a complete hot-water system in itself, built for years of constant service. It is automatically controlled to provide ever-dependable supplies of hot water at all times—with minimum current consumption.

AND, because of the extreme simplicity in design and construction, there is so little risk of anything going wrong.

Heatrae

TRADITION . . . QUALITY FIRST . . . ALWAYS

HEATRAE LTD. · HEATRAE WORKS · NORWICH

Manufacturers of: Electric Water Heaters, Oil Heaters, Immersion Heaters, Urns, Towel Rails, Air Cupboard Heaters, Flameproof Heating Apparatus, Breakfast Cookers, Electric Fires, Food Trolleys, Warming Plates, Air Heaters.

Cables

C.M.A. FIRMS HAVE LED THE WAY

they were first with

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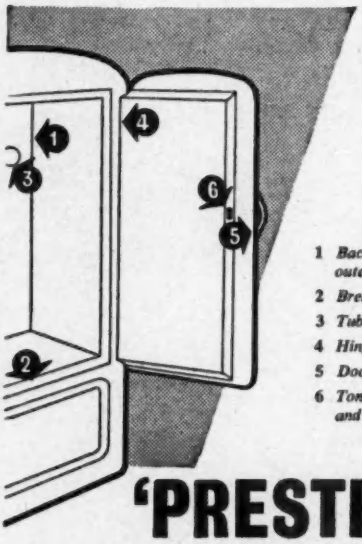
52/54 HIGH HOLBORN, LONDON, W.C.1. TELEPHONE: HOLBORN 7633

66-kV small-oil-volume circuit-breaker assembly

Reyrolle

A. REYROLLE & COMPANY LIMITED · HEBBURN · CO. DURHAM



1 *Back panel outer shell*
2 *Breaker strip*
3 *Tube entry*
4 *Hinge screws*
5 *Door latch*
6 *Tongue plate and screws*

'PRESTIK'

SEALING STRIP

points to perfect sealing

A special grade of 'PRESTIK' has been developed for refrigerator sealing following 'PRESTIK'S' successful usage in many branches of the electrical industry, e.g. radio apparatus, washing machines and switchboxes.

'PRESTIK' provides an easy and efficient means of sealing against moisture; it is non-corrosive and withstands extremes of temperature.

'PRESTIK' and 'BOSTIK' together can provide the answers to your adhesive and sealing problems. Call the 'BOSTIK' man for advice on the manner in which 'PRESTIK' and 'BOSTIK' products can help you.

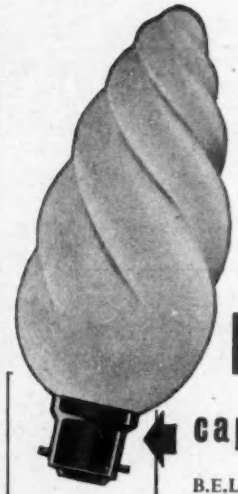
PRESTIK

SEALING STRIP

manufactured by the sole proprietors:

B. B. CHEMICAL CO. LTD

ULVERSCROFT ROAD, LEICESTER

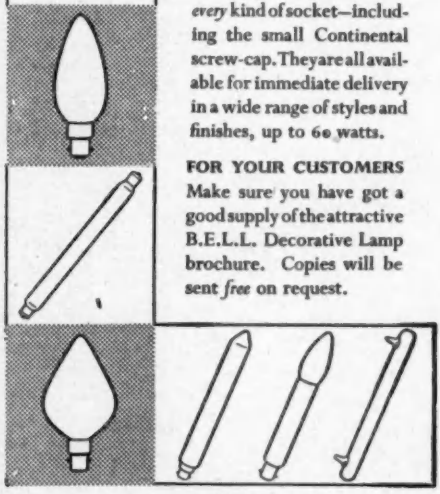


Whatever the fitting B.E.L.L. caps the lot

B.E.L.L. Decorative Lamps are made in cap-sizes to fit *every* kind of socket—including the small Continental screw-cap. They are all available for immediate delivery in a wide range of styles and finishes, up to 60 watts.

FOR YOUR CUSTOMERS

Make sure you have got a good supply of the attractive B.E.L.L. Decorative Lamp brochure. Copies will be sent *free* on request.



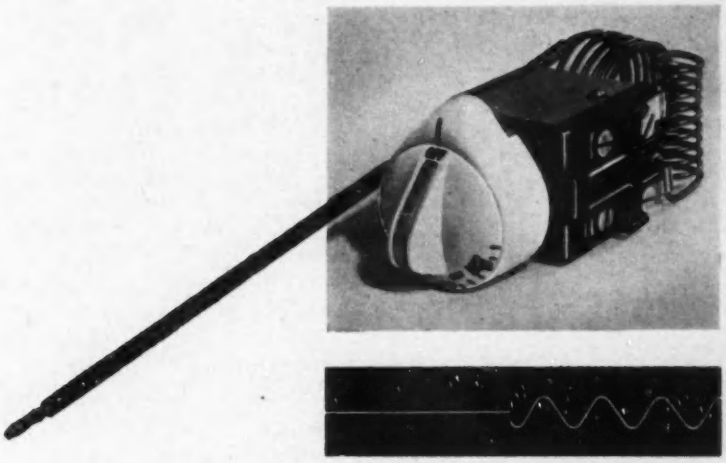
B.E.L.L.

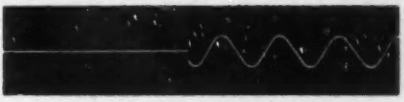
DECORATIVE LAMPS

BRITISH ELECTRIC LAMPS LIMITED
Showrooms & Stores: 229-231 Westminster Bridge Road, London, S.E.1. Tel.: WATerloo 4788/9

"SATCHWELL"

ELECTRIC COOKER THERMOSTATS





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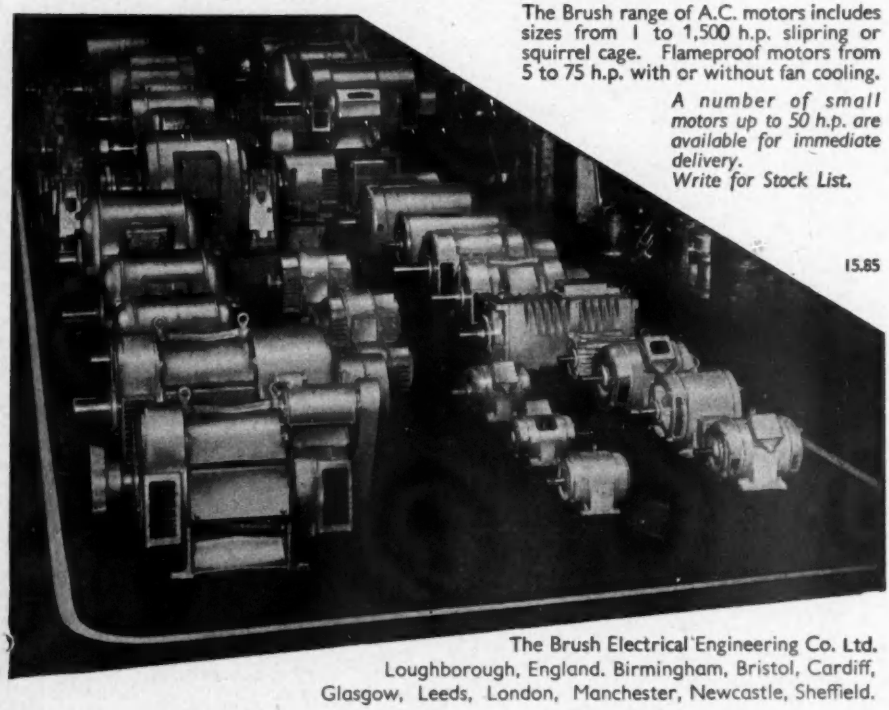

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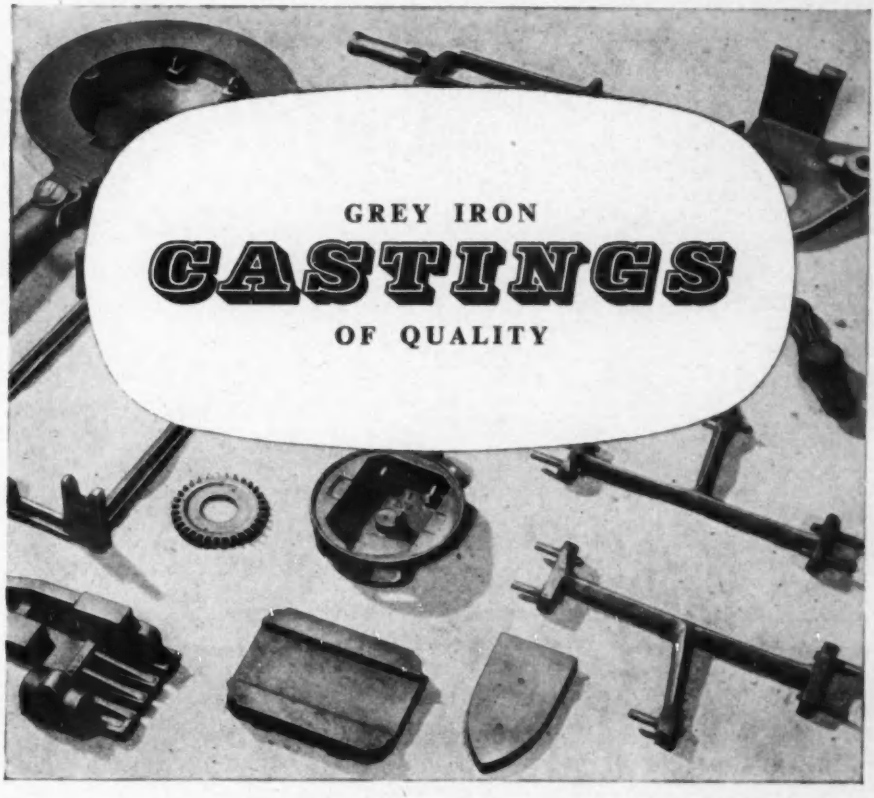

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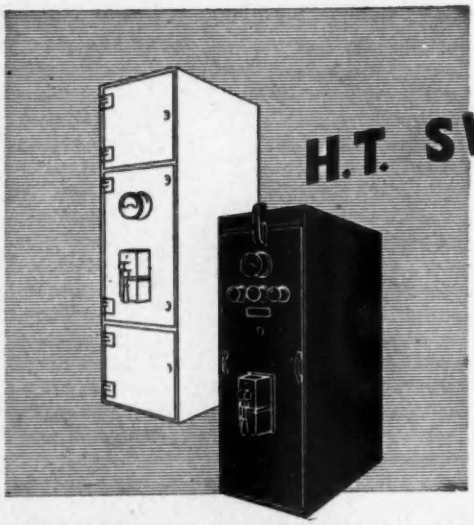

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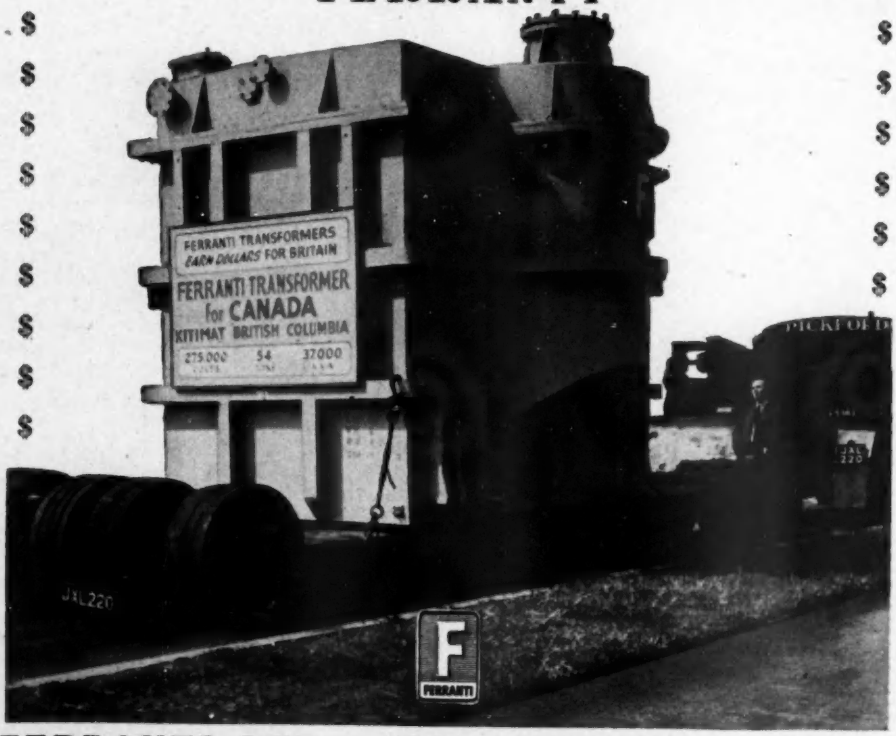

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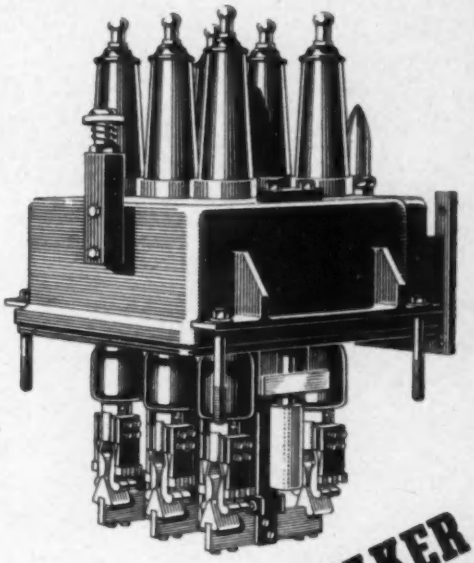

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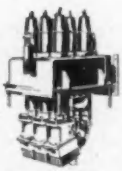

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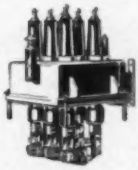

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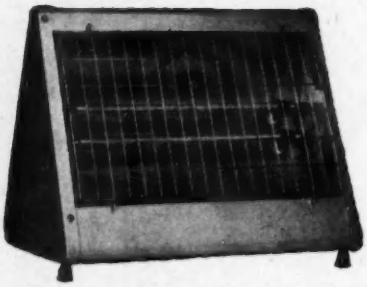

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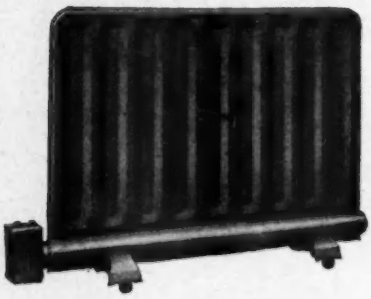

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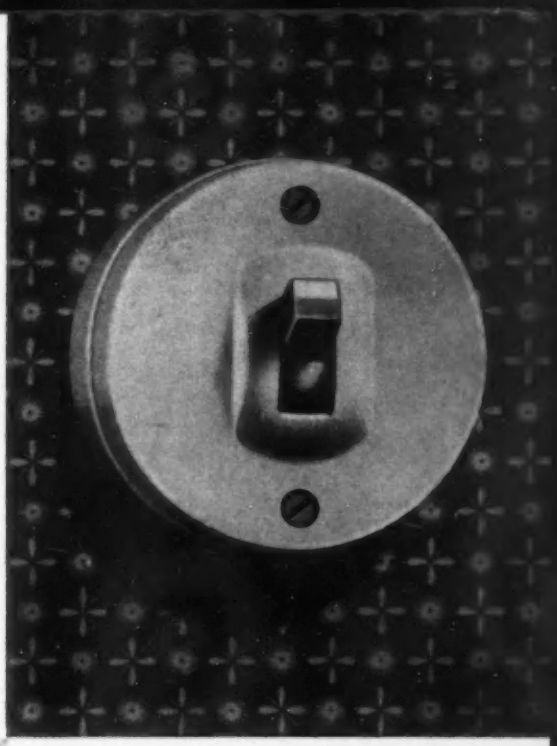

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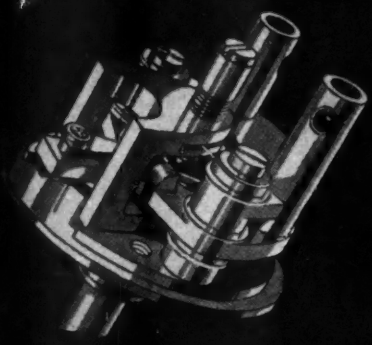

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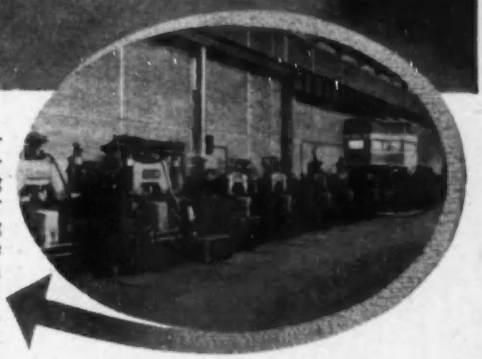

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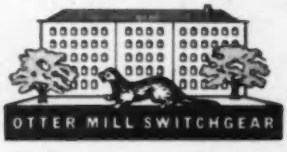

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ELECTRICAL TIMES

Volume 124 No. 3229 24 SEPTEMBER, 1953

PUBLISHED EVERY THURSDAY

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Editor and Managing Director:
ROY BALDWIN
M.I.E.E., Barrister-at-Law

Assistant Editors:
J. K. JOHNSON
B.Sc. (Eng.), A.M.I.E.E.

K. C. POUNDS
B.Sc. (Eng.), A.M.I.E.E., A.C.G.I.

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Editorial

NEW I.E.E. EXAMINATION

IN the past, the Institution of Electrical Engineers' examination has been a technological test with a strong leaning towards the everyday experience of engineering. Now all this is to be changed. The examination has been completely revised, and the newly published syllabus shows a marked emphasis on the scientific basis of electrical engineering: more mathematics, more physics and less engineering general knowledge are its characteristics. Such a change follows understandably from the increased insistence on practical training for student electrical engineers that has marked successive changes in the Institution's bye-laws in recent years and has made it less necessary to test practical knowledge. The professional engineer of the future will be nearer the university graduate in his foundation of fundamental knowledge than he commonly is today. As a result, his willingness and ability to cope with new ideas should be increased. This is a desirable gain, but it is purchased at a considerable price. No longer will successful completion of the five years of evening classes leading to Higher National Certificate fit a student educationally for the coveted corporate membership of the Institution. At least another year of study seems likely to be necessary, and the personal problems that this involves for the young man of 21 or 22 are likely to be considerable and, in some cases, overwhelming.

WITHOUT THE WALL

IT is not only the young student who is affected by these changes, however. The older man, who has climbed by merit and informal study to a position of responsibility, and who wishes to set upon this the seal of a professional qualification, will in future find his way harder. The practical bias of the Institution Examination formerly enabled him to prepare for many of the papers by revising and systematising what he already knew and applied in his daily work; indeed, in its origins, the examination had been designed for such as he. Now this possibility is to disappear, and the necessary study for the examination will be a gruelling and probably unrewarding task for such a man. Though there is hope for him in the discretion the I.E.E. Council retains to interpret the strict letter of its law more favourably for the deserving case, in general he will have to turn elsewhere for the recognition he requires. To the extent that he does so, and that promising youngsters fail to stay the lengthened course, the corporate membership of the Institution will be the poorer. None the less, the new syllabus is an acceptable advance that should, in the long run, be of value both to the profession and to the country.

COAL IS UNCERTAIN

GENERATING stations in Great Britain will start October with 7 per cent less coal in stock than last year, but with 8 per cent more generating capacity. These are the stark facts of the current coal situation, and they suggest trouble in the future unless there is an improvement in deliveries. The comparison they imply requires cautious interpretation, for stocks held at stations last September were unusually high, but in spite of this, and although station stocks stand at present at the not unsatisfactory level of 6·2 winter weeks' supply, the present position is disquieting. It has to be seen against the poor level of production this year: 2 million tons less of deep-mined coal and 0·5 million tons less of open-cast production. Unless there is some advance on this, the supply industry, although it may survive this coming winter without undue embarrassment, will emerge with stocks so low that it will be difficult to build them up to a safe level

for the 1954-55 winter. There are real grounds for expecting an improvement, for to some extent the relative fall in production has been due to an extra week's holiday for miners this year. Now that the holiday season is at an end, output should increase. By how much is the unknown factor on which, together with the still less predictable weather, the prospects for the next two winters of electricity supply largely depend.

A MANX EXCESS

WITH a fixed population of about 50,000 and an area of under 300 square miles, the Isle of Man is smaller than many of the supply districts of the area boards. Yet two separate publicly owned authorities operate strictly separated generating plants and distribution networks within its shores. Recent reports from the Douglas Electricity Undertaking show that this arrangement is proving as expensive for consumers as one would expect. Now necessary but unpopular tariff increases are causing renewed pressure for some agreement that will permit a more efficient combined use of the Island's generating equipment. Thus an atmosphere favourable to some compromise agreement exists at the present time, and every effort should be made to take advantage of it and secure some rationalisation of an unfortunate situation that should never have developed.

BOOST FOR TRADE

LAST week's reduction in the bank rate seems to admit of no simple interpretation, but there is general agreement that it indicates official recognition of some slackening in inflationary pressure. Since the purchase tax was applied with an anti-inflationary purpose, are we to assume that trading will be further encouraged next spring by some further downward movement in p.t. percentages? The possibility must be strongly considered and it adds urgency to the study of ways in which retailers can avoid renewed losses on the tax-paid stocks in their possession. So long as the Government continues its attitude of giving no compensation for such losses, manufacturers are faced with the need to find some way of relieving retailers of this business hazard, if a trade-stultifying spring buyers' strike is to be avoided. The most practical alternative at present seems to be some form of sale-or-return contract, but unfortunately, although the legality of such arrangements is recognised, the complications of keeping within the limits approved by Customs and Excise officials are considerable as recent correspondence in *The Times* has shown. There is an urgent task here for the electrical trade associations, who might well study the possibility of producing workable model schemes for adoption by their members. Simplest of all, however, would be recognition by the Government that justice demands some direct compensation for the retailer.

PRIORITY CHOICE

CHOOSING the books you would read on a desert island used to be a mental exercise of some popularity, and more recently radio has substituted gramophone records and revived the game. But suppose the choice concerned not entertainment, but the amenities of modern civilised existence, what would one select first if resources were limited? Living on a near-island, formed of houses on piles built in an inaccessible swamp, the people of the new Nigerian town, Aiyetoro, have chosen electricity, and the story of how it was brought to them is told on a later page. Beyond the considerable technical interest of this tale there is surely a moral. Even to the developing West African, electricity has become a necessity of civilised life. Nor is the use confined to lighting: the electric irons used in the communal laundry of this strangely organised fisher-town indicate that the convenience value of electricity for heating is fully appreciated in Nigeria, whatever opinions may exist elsewhere. Indeed in its insistence on a supply and its enterprise in obtaining it, Aiyetoro offers an example to other places near home.

Meteor

Electricity comes to Aiyetoro

SELF-HELP DISTRIBUTION IN A NIGERIAN TOWN ON STILTS

By J. MELLANBY, M.A., A.M.I.E.E., M.Inst.F.

YOU won't find Aiyetoro on a current map of Nigeria, but it exists nevertheless, right on the coast, 104 miles east of Lagos, and recently its first electricity supply was switched on.

Founded in 1945 by a handful of pioneers of a new religious sect, the Holy Apostles' Church, Aiyetoro has grown under the rule of Chief (or Oba) Peter Jagbo, spiritual and temporal leader of his people, to be a community of approximately 3,000. Philip Eretan, the original founder of the Sect remains in the background as a kind of constitutional monarch and adviser. They practice common ownership of property, and there is no internal circulation of money. Their income, which is considerable, mainly derived from the sale of fish, is almost entirely devoted to a policy of continuous improvement of the town and its people's living conditions. There is no hospital or doctor, their beliefs being similar to Christian Science, but a number of simple sanitary rules are in force to such good effect that not only is the town entirely free from the offensive odour prevalent in many African cities, especially parts of Lagos, the capital, but the health of the people is so good that a belief is growing up that "nobody ever dies in Aiyetoro." This may seem all the more surprising since all the houses are built on piles over a swamp, and the streets, of which there are over two miles, consist of boarded walks varying from 4 to 8 ft wide.

This aerial view shows the gridiron construction of Aiyetoro (Photo courtesy of "Nigeria")

Originally the houses were built in the local traditional pattern, with thatched roofs and closely spaced bamboos for floors and walls. All the thatch has now been replaced by corrugated aluminium, and a gang of carpenters is continuously at work fitting hardwood floors, weatherboarding, internal panelling and glazed doors and windows, the timber being derived from the forest some miles inland where they maintain a party of pitsawyers. In other ways they are largely self sufficient, they weave much of their own cloth on hand looms, and a tailoring department equipped with 16 sewing machines is kept fully occupied. Their greatest public work, however, was the cutting of a canal, 7 miles long leading to Mahin Lagoon, and so connecting with the extensive inland waterways of the country.

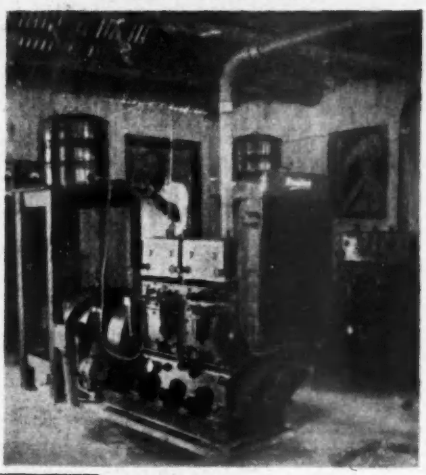
Site Difficulties

Some years ago the Aiyetoro people decided that one amenity they would very much like was a supply of electricity, and as, owing to their remote situation there was no possibility of getting this from public sources, they approached the United Africa Co. in 1951 with an enquiry for a power station and complete distribution system, and a preliminary survey was made by Mr. R. V. Robinson, an engineer of that company. Generator foundations presented an imme-

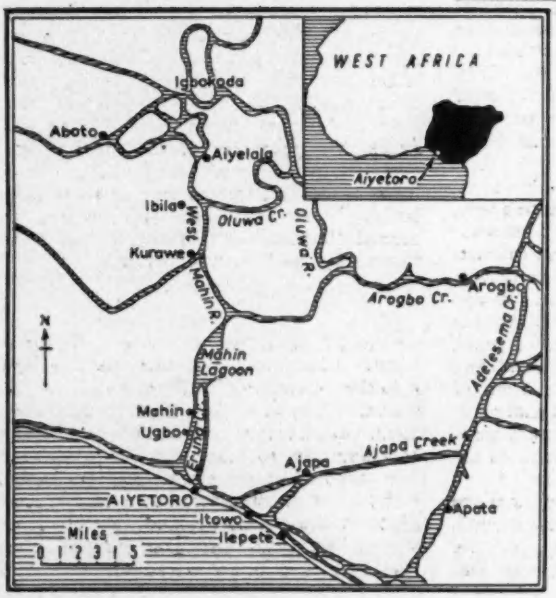
diate difficulty. The only permanently dry land in the town is an artificial island approximately 80 feet square, though the Church has a concrete floor. The plinth of this is formed from cement blocks apparently built directly on to the mud; although serious cracking of the floor has taken place, this is apparently due to defective filling. The blocks themselves have remained firm, though as the superstructure is wood, it is very lightly loaded. One proposal was to mount the generators in a barge, which could be fitted up in Lagos and towed to the site. This scheme was abandoned on advice that the presence of teredos would rapidly destroy any timber craft. Although this information was later found to be unduly pessimistic, the deciding factor was the draft of any vessel navigating the canal, so that the heaviest component of any plant had to be capable of being carried by canoe. These canoes are of the "dug-out" type, carved from a single trunk and vary from 20 to 60 feet in length, the larger ones being able to carry loads of about 3 tons.

Finally, three Ruston & Hornsby 4VSH engines driving 32 kVA alternators were ordered. The complete plants were made up by Brodie & Askham Ltd., of London, and the whole of the material for generation, distribution and wiring was supplied by U.A.C. (Technical) Ltd., Lagos, while the author entered into a contract to supervise the installation of the power station, mains and services. The Apostles stated that, partly as a measure of economy, and partly because of their policy of self-sufficiency, they would like to do as much as possible of the work themselves, so that only the minimum of skilled workers should be brought in from outside. This sounded like "dilution" with a vengeance, but experience of the same policy, though on a smaller scale, while carrying out installations in schools where the pupils rendered invaluable assistance, had proved eminently satisfactory.

One of the three 32kVA generating sets in the newly-erected power station



Aiyetoro—its immediate surroundings and, top right, its position in Nigeria



On 25th June, 1953, the author and an African staff of three left Lagos in one of the large canoes, fitted with an outboard motor, and arrived 28 hours later at Aiyetoro, after a pleasant and nearly uneventful journey.

The Foundations

The design of the foundations for the generators was entrusted to Mr. S. L. Harris, M.A., A.M.I.C.E., of Cambridge University Engineering Department,

These three views show the types of line pole used and, incidentally, the nature of the town. The church is in the background of the left hand view

who produced plans for a reinforced concrete raft strengthened by four perimeter beams, with a sufficient factor of safety to comply with the largely unknown conditions.

Quantities of stone, sand and cement had been obtained in advance, the last being stored in the Church. The stone consisted mainly of silica, and was of excellent quality, but that which had been broken was much too large in size. A screen was rigged up by overlapping two pieces of expanded metal, which gave the correct grading, and a force of men, women and children appeared armed with hammers, iron bars, etc., to break up the large lumps. This stone breaking continued for about four days until the required 16 yards were obtained. The sand was very dirty, and not particularly suitable. This, however, caused no dismay, and a fleet of small canoes, each paddled by a woman, was sent to Mahin for some better material. This was one of the first lessons learned at Aiyetoro; if a job had to be done, it just got done, perhaps in a primitive and time-wasting way, but properly directed, it could be done well. Their method of washing sand was interesting. A small canoe was used as a sluice box, the sand placed in a basket in the bows and water poured through it—this fulfilled the double purpose of catching pieces of grass, etc., and thoroughly mixing the sand and water. Dirty water was then baled out of the stern. The only improvement that modern science could suggest was to wash three times by three canoes in series, when an excellent product resulted.

Examination after arrival showed that the water level was about 2 feet below ground, so rough concrete was laid on which to place the reinforcement. The first setback was when it rained almost continuously for five days and nights, and the water rose over a foot. On asking when it would go down again, the answer given was "December," which did not sound helpful. However, by digging a series of "wells" round the job, and keeping a gang baling them out it was possible to maintain the water level below the work indefinitely. Mixing 16 yards of concrete by hand is no mean task, but the Apostles were equal to it. Four platforms were arranged, and four gangs did the mixing with over 100 other helpers for carrying. Work commenced at 6.30 a.m., and had been expected to last all day, but was completed by 1 p.m., so the afternoon was spent by Ayo, the electrician-bricklayer, in laying the surfacing layer straight away. Baling of water continued for 36 hours to prevent any possible damage. When the shuttering was struck the appearance of the concrete was excellent, in spite of all fears. The reinforcing rods were all formed on a small conduit bending machine (which later fulfilled its normal function) and cable channels were formed by the "Ductube" system.

The Overhead Mains

All-aluminium conductors were used for overhead mains, partly because of availability and price, but also because the Apostles considered this material to be specially corrosion resisting. It has been mentioned that they have made extensive use of aluminium roofing—some of which has been exposed to the sea air for four years. Although it has weathered to a pale yellowish tinge, there is no apparent sign of corrosion or pitting, and the under surfaces, even when exposed under verandahs, are still

Afin, the chief's house, with a line alongside

bright. Care was used, however, only to employ the special fittings made for this system, and to avoid all exposed joints in dissimilar metals.

Ekki (*Laphira Alata*), locally known as Omeghi, was used for poles. This timber is used for the piles on which the houses and roads are supported, and has a life of very many years, being highly resistant to all the prevalent destructive agencies. The method of preparation is interesting. First the bark is stripped off with matchets, followed by the whole of the sapwood; it is easy to see when this is done as it is pale in colour while the heart wood is dark brown. The whole surface is then planed smooth. Most of the poles showed some signs of attack by quite large insects which had burrowed below the bark into the sapwood, probably while the tree was growing, but very little damage was done to the heartwood. The local carpenters had learned the trick of using a thin lubricating oil when drilling this wood, which made a tremendous difference to the speed and ease of operations. No preservative of any kind was used, but every pole was fitted with a roof made from a scrap of the aluminium sheeting. This was a local idea, and is not normally done elsewhere in Nigeria, where destruction of poles spreads much more rapidly from the bottom than from the top. The only disadvantage appeared to be the impossibility of getting long poles; most were only 22 feet (the normal local requirement is 26 feet), and it was noticed that above this height the diameter decreased very rapidly. However, by careful selection, a number of 24 foot ones were obtained for the main run. It was considered unnecessary to insist on a greater height of the bottom conductor (neutral) than 15 feet above the walks, owing to the fact that these could not possibly be used by vehicles. In fact the only "vehicle" in the town is a primitive bath chair made for a cripple. This was fitted with new wheels made from the flanges of a cable drum.

Pole Erection

Assurances had been given that the question of poles and their erection would be taken care of and need present no difficulties, though when it was found that the ground, under about a foot of water consisted of mud, grave doubts were entertained. However,

Left to right, Ayo Williams, H. Ope, the Author and G. Dominic

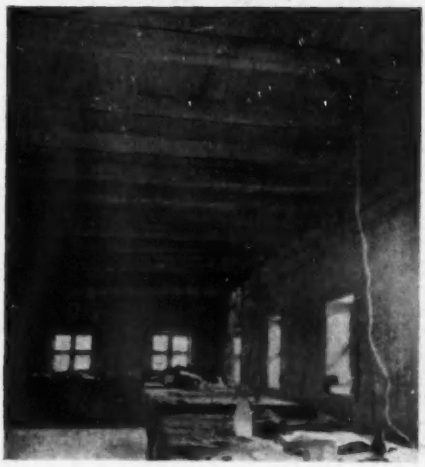
there was evidence in the piles supporting the houses, where practically no subsidence had occurred. A gang of the fishermen was put on to erection while they were not fishing. Their method was simple in the extreme—after the position had been marked with a rod, this was removed and a pointed stick driven in a few feet in its place, the pole was then erected and just dragged down until the correct height was obtained. After having bad dreams about coffer-dams and concrete foundations, one line was put to the test, and three conductors were strained between two strutted poles, which, to the surprise of the strangers and the vindication of the inhabitants, held well. Later one strutted pole was pulled over, but this time the wires were

drawn up immediately after it had been erected; after standing for 24 hours the mud appears to gain in strength and stability. Much of this erection was personally supervised by the Oba himself; he showed that he possessed a remarkably good eye, and if anything was not just right it had to be done again. The only place where the mud failed to live up to expectations was at the ends of the main line, which consisted of 4×7/·122 and 1×3/·144 aluminium alloy conductors. Stay anchors had been provided by driving poles about 13 feet into the mud, but one proved to be insufficient. Three, however, mounted in tandem and joined by rods took the strain adequately.

The insulators and ironwork were of standard British types, in which the bolts were of the length suitable for softwood poles. Hardwood ones were generally smaller, so it would be a great help if manufacturers exporting this material to tropical countries would at least provide extra long threads on their bolts; in this case the patient Apostles did not seem to mind running down some hundreds by hand—at least it kept them busy on wet days. The empty drums, when dismantled, provided an invaluable source of bolts and nuts when normal supply failed.

Line Taps

The type of tapping used was that in which the copper conductor is placed inside an aluminium tube filled with graphite grease, which is then squeezed up in a line clamp. Many of the tappings, particularly those to the smaller 3 and 4 point houses and the street lights, were only 3/·029, and a lot of work was involved in binding this to the required diameter to make a nice fit in the tube until the idea was hit on of wrapping it once round a short length of the 0·132 in. aluminium wire before inserting it.



The interior of the communal laundry showing electric irons and pendant switches

Installing the System

It was not necessary to give any instruction in the handling or erection of poles, as was the case with most Nigerian labourers previously encountered. In fact, the Aiyetoro fishermen were more efficient than many alleged "experts" met with in more "civilised" parts, and they worked almost silently, in place of the usual shouting. Occasionally "Esho" would be heard. The full expression is "Eshove kola," which can be translated as "Upsydaisy, let it go," but this was never heard in Aiyetoro. Some of the people also became quite expert with the draw tongs and ratchet, and learned how to make off the ends. Both Apostles and outsiders alike worked quite happily on frail bamboo ladders with rungs 2 feet apart, and vetoed any suggestion that something more substantial should be made, on the grounds that it would be much heavier and therefore more trouble to move about.

In a few cases where the wires passed over roofs it was necessary to erect a subsidiary support to give adequate clearance. This greatly worried the Apostles, as they were afraid of rain penetrating the roofs at these points. However, when a demonstration of a "flashing" was made, they quickly seized upon it. Their community includes a competent tinsmith who makes all sorts of domestic utensils from the offcuts of the aluminium roofing sheets.

The layout of the job, a central spine with branches, required an abnormally high proportion of stayed or strutted poles. The Apostles showed a decided preference for timber struts, on the grounds that wood was material they fully understood, metal stay rods, strainers, etc., were foreign to them and might rust away. Out of 110 poles, 37 required struts and 26 stays.

The weak point in any overhead distribution system, especially where consumers are closely packed together, is often in the services, and these occasioned some difficulty. The Aiyetoro houses fall into two main designs, large, with a hipped roof terminating

in short gables, and small, with a plain hipped roof. The former type, of which there were 88, presented no difficulty, as service insulators were fixed to the gables, and 0·144 wires run from the nearest pole, the average distance being 25 ft; t.r.s was then taken through the roof space to the main switch on the verandah. The other design proved quite a headache. The verandah roofs came down to seven feet above walk level, and the community were unwilling to provide either service gables or subsidiary poles for each house. Since they were mostly arranged in groups of four houses, the arrangement illustrated, using p.b.j., or p.b.j. and h.s.o.s. cable was adopted. While not particularly beautiful, it was at least simple and reasonably effective, and only required one subsidiary pole for four connections. No small line taps were available for making connections on the 7/·029 p.b.j., so a scheme was devised for removing surplus terminals from the bakelite junction boxes used for t.r.s. wiring.

Control and Wiring

It was stipulated that the main and public lighting circuits be switched independently. A continuous solidly connected neutral was therefore provided, and the town divided into two sections, each controlled by a 100 amp t.p. switch fuse. A 30 amp t.p. switch fuse controlled the public lighting. In contrast to the high resistance lateritic soils encountered in many parts of Nigeria, earthing was no problem in wet mud, where an 8 foot rod could be pushed home by hand. The neutral was earthed to one of these rods at the Power Station, while others were installed in premises containing plugs and sockets.

The houses and most public buildings were wired for lighting only. This was carried out in t.r.s. cable and standard G.E.C. accessories by Mr. Aliu Ajose, Registered Contractor of Lagos. Although the switches were mounted 6 ft 6 in. above the floor, it was found that small children removed the covers of the "Slick" type for playthings, and they had to be replaced by those with 2 fixing screws. Fluorescent lighting was installed in the Church, and some domestic appliances are in use in the Afin (Chief's house).

Special mention must be made of the Laundry. It is part of the Apostle's religion that cleanliness is next to godliness, and this is literally so, as in order of size the Church (100 ft × 60 ft) is followed by the Laundry (106 ft × 30 ft). Actual washing is done outside by hand in "cold" water (average temperature 85°F) and the building is used for ironing and sorting. Originally charcoal heated irons were used, but the new building was specially constructed to house the electric system now to be described. 24 ceiling points were installed, each comprising 13 amp socket, ceiling switch and pilot lamp, arranged on three ring main circuits, one on each phase. Each circuit was run in 7/·036 twin t.r.s. from the t.p. and n. switch fuse and back again, together with a separate 7/·029 bare earth wire. It was not certain whether it would have been permissible to economise in cable by feeding all three circuits from a common neutral and earth. Thermostatic irons of 600 and 1,000 watts are in use, totalling approximately 20 kW. With the diversity occasioned by the thermostats, the average load with all in use was about 12 kW. The cloth being ironed was mainly light cotton, and the workers did not move very fast, so each element cut out for a fair proportion of its time. It was therefore possible to employ a night shift on this work, and the load, together with about 7 kW of public lighting, provided an economical output for one of the 25 kW sets.

Inauguration

The whole job was completed in 8 weeks, which included delays due to excessive rain, as previously mentioned, and the delivery of materials. An inauguration ceremony was held on August 24th; a religious service took place in the Church, followed by dancing, after which the party moved in procession to the power station for a formal switching on. A large crowd of visitors attended, including Press representatives. This is the first ocasion when outsiders have been permitted to attend a service in the Apostles' Church, at which seats on the dais, flanking the Oba, were provided for the Editor of the Lagos "Sunday Times," and the author.

While Aiyetoro is in many ways unique, it is only a manifestation of the remarkable powers of co-operation latent in many African people, and only requiring leadership to bring to light. The *modus operandi* described above might well be copied for many 'development' schemes—while this would not provide the grandiose projects beloved of politicians, it would not only save a great deal of the taxpayers' money, but at the same time give the people being "developed" a real interest in what was being done, and make for closer understanding between "Imperialist" and "Colonial." It would also open up a valuable market for many products, especially smaller equipment.

New I.E.E. Examination

Revised Syllabus places Emphasis on Scientific Fundamentals of Engineering

IMPORTANT changes in the requirements for the Institution Examination of the I.E.E. are made in a new set of Regulations published this week. The examination is now split into three sections instead of its present two, and once this arrangement is fully operative a Higher National Certificate will no longer give exemption, on a subject-for-subject basis at the appropriate level, from the whole of the examination, but only from Parts I and II.

The reason for the change is set out in the foreword to the September issue of the Institution's *Journal*. Subjects and syllabuses for the examination as it previously existed were prepared to give a fair test for "older" candidates who were already employed in positions of some engineering responsibility. It has become increasingly obvious, however, that these syllabuses are being used as a guide to the preparation of courses for the professional education of the student electrical engineer. They have now been recast to meet this requirement, and in the result there is more stress on engineering science and less on practical technology.

Little change is made in the subjects of Joint Section A of the existing examination, which now becomes Part I, but it is intended that it shall lay more emphasis on fundamental principles. As announced earlier this year the subjects are English, mathematics, applied mechanics, heat, light and sound, and principles of electricity. All are compulsory.

Maths and Physics

The new Part II consists of Electrical Engineering (two papers), mathematics and either engineering physics or thermodynamics. The syllabuses for the two electrical papers have noticeably less concern with the construction and operation of electrical equipment than has the corresponding paper in Section B. Subjects covered are units, electrostatics and electromagnetism, transformers and electrical plant, electrical circuit theory, electronics and electrical measurements.

In the new mathematics paper the syllabus extends to second order linear differential equations, functions of two independent variables, and Fourier expansions. Engineering physics deals with the structure of matter (elementary atomic theory and crystal structure), electricity (e.g., thermionic and photoelectric emission, conduction and semi-conductors), light and radiation (e.g., Plank's, Wien's and Stefan's laws, momentum and pressure of radiation) and basic thermodynamics. The alternative of thermodynamics appears to cover about the Part I London B.Sc.(Eng.) syllabus.

Advanced Electricity

Advanced Electricity, the one compulsory subject in Part III, is markedly "fundamental" in character. The sections of the syllabus are units and standards, electrical circuit theory, electrical measurements, field phenomena, and closed loop systems. To complete Part III of the examination two papers must be taken from the following: electrical machinery, electrical measurements, electricity supply, electronic engineering, illumination engineering, line communications, radio communication, and the utilisation of electric plant. In all these papers the new accent is on fundamentals rather than descriptions of construction and operation.

No age limits are set for the new examination, but the Institution considers it inadvisable for candidates to attempt Parts II and III before reaching the ages of 21 and 22 respectively. There is an inference here, of course, that Parts II and III should not normally be taken at the same examination.

Part I of the examination will be set for the first time in April 1954, Part II in April 1955, and Part III in April 1956. As has been announced earlier, candidates who have passed the present Joint Section A by the end of this year will be given until April 1956 to complete Section B in its present form. Candidates who pass Part I after 1953 will be required to complete the remaining part of the examination in its revised form.

In general, approved university degrees, college associateships and Higher National Diplomas will continue to exempt from the whole examination. Higher National Certificates and certain other qualifications will as stated above exempt from Parts I and II.

Electricians' Wage Dispute

ACCUSATIONS BY BOTH SIDES AT PUBLIC INQUIRY

IF the National Federated Electrical Association would make some interim concession, the executive of the Electrical Trades Union would be willing to resume negotiations, declared Mr. Walter Stevens, general secretary of the E.T.U., at the Court of Inquiry set up by the Minister of Labour last week. He added that the union wanted to try and get, by negotiation, some compromise settlement between the employers being forced to make a total wages award based on the strike, or the union being placed in the difficult position of accepting plain arbitration on the whole of the case. But he denied that that was to save face.

A "Substantial Increase"

Earlier, when asked by the Court to explain the principles followed by his union in its wage negotiations, Mr. Stevens said that claims were based on changes in the cost of living, on the size of the employers' profits, and on productivity. Of these the most easily measured was the rise in the cost of living. Explaining that it was usual for the union to demand, as it had, "a substantial increase," he said it was a form of argument familiar to the employers to ask for an unspecified but substantial increase in wages. It was left to the employers to name a figure. The union would not normally name a figure unless asked to do so by the employers.

When the inquiry began last Thursday Mr. Walter Stevens accused the National Federated Electrical Association of "repeatedly interrupting the established course of negotiation." He alleged that the intransigence of the employers had reduced the negotiating machinery to a farce and that the union had been forced to call a strike of electricians in the contracting industry. He outlined two disputes of "a minor character": the first being at Battersea Park Festival Gardens where, he alleged, the association suspended the negotiating machinery and the union had to take strike action. After intervention of the Ministry of Labour, the machinery had been functioning for only a month when the association again switched it off over a minor dispute, which he felt could have been resolved more expeditiously had the association adopted a less provocative attitude.

The union submitted that the action of the employers in suspending the negotiating machinery because of a minor dispute was unheard of in modern industrial relations. It created a lack of confidence in the machinery and aroused the gravest suspicion as to the intentions of the employers' association, the union contended.

After quoting from letters exchanged between the union and the N.F.E.A. Mr. Stevens said the latter's reply was interpreted by the union as a formal rejection of the claims which were originally submitted to a meeting of the Joint Industrial Council on March 23. Replying to the chairman, he said that up to June the union had not submitted any definite figure but had asked for a "substantial increase." The union warned the association that failing the offer of a wage increase by August 24, official strike action would be sanctioned. Instead the association allowed five weeks to pass without any reply other than a formal acknowledgment.

The union had attempted to show that on the basis of the increase in the cost of living alone the men were entitled to an increase of at least 3d. an hour in London and 2½d. an hour in the provinces, Mr. Stevens went on. Attention had also been drawn to the increase in rents and fares. When negotiating representatives of the union met the association's representatives and renewed their appeal for an answer, the N.F.E.A. representatives had said that they must consult their branches. The union, however, had expected a team with full powers to make an offer, and considered that the association had not made a responsible approach to what was then an extremely serious matter. The strike was then called again because of the intransigence of the employers.

Mr. Stevens contended that the union had conducted the dispute so far as possible with scrupulous regard to the public interest. Replying to further questions, he said he did not think the union would now voluntarily accept a straight reference to arbitration of the wages dispute.

The N.F.E.A. View

Submitting the association's case, Mr. H. J. Phillimore, Q.C., maintained that those in control of the union had sought to force through by strike action a claim for increased

wage rates which the association had rejected because it believed it was unjustified. The association felt that it was because the union knew the claim to be unjustified that the union dared not submit it to arbitration. Those in control of the union had directed the strikes in such a way as to inflict the greatest possible injury on the industry and the machinery for the peaceful settlement of disputes between employers and employees, he went on. Under the union's rules, the Executive Council could authorise a strike and any member who failed to comply with the instruction was liable to a penalty. The reason the union rejected the association's offer to hear in full the reasons for the rejection of the claim was that the action which the union subsequently took had already been decided, he contended.

After pointing out that most of the union's executive belonged to the Communist party, Mr. Phillimore declared that the sites of the strikes had been carefully selected to do the greatest possible damage to the national economy. How could that selection be reconciled with Mr. Steven's pious statement that the dispute was conducted "with scrupulous regard to the public interests" he asked.

Interjecting, Mr. Stevens said the sites were not selected because of their national importance but their importance to the union in its dispute with the employers.

Mr. Phillimore then asserted that the strikers themselves disagreed with their leaders' policies and were reluctant to strike. "Why had the strikes been aimed at the defence programme and the victimisation of members of the Council of the employers' association," he went on. "That may be a matter for speculation: it was obvious no industry would continue to act efficiently under constant and incessant claims for wage increases accompanied by threats," he concluded.

Strike Sites

The selection by the union of the sites for the strikes was the subject of questions during Friday's session. Mr. Stevens explained that these were selected by a sub-committee consisting of Mr. F. Foulkes (president), himself, Mr. F. Haxell (assistant general secrtary) and four members of the executive. Mr. Phillimore, representing the association, referred to some of the places which were affected by the strike: a Leyland's factory making tanks, Aldermaston and Capenhurst atomic research establishments, and an oil refinery at Ellesmere Port, and asked if the places chosen were calculated to affect the defence programme. That was not taken into consideration, Mr. Stevens replied. They merely considered that they were taking strike action against the employers. He was perfectly certain the sites were chosen for purely industrial reasons.

Later, when asked if the strikes which were ordered were in line with Communist policy or not, he declared that he did not know. They were in line with the policy of the E.T.U. on that question. Further asked if the places where the strikes occurred had anything to do with the fact that those who were directing and selecting them were members of the Communist Party, Mr. Stevens declared that it had nothing to do with it whatsoever. Strike action was taken in places where it hurt employers most.

Asked by Sir Graham Cunningham (a member of the Court) if the union would still be prepared to go to arbitration, Mr. Stevens said he could not commit the union. Personally, he would do his utmost after the inquiry to endeavour to re-establish, if the employers were willing, proper harmonious relations in the industry. But that did not mean he could give an immediate undertaking.

No Stalling

Mr. L. C. Penwill, secretary and director of the N.F.E.A., then first referred to earlier disputes with the union which led to the association suspending the negotiating machinery when they considered that the union had made breaches in the national working rules. The union, he said, had taken direct action without recourse to the machinery. A campaign had started in which the union took strong objection to redundancy.

In regard to the wages claim, he denied that there was any stalling by the employers. He also thought that earlier "token" strikes had been organised by the union and were not, as Mr. Stevens maintained, spontaneous. Mr. Penwill and his colleagues were of the opinion that the E.T.U. knew exactly what alternatives were open to them when they received the association's reply in August, but the union deliberately chose the policy of "guerilla warfare." His committee would have seriously considered arbitration but rejected that because they were of the opinion that the E.T.U. had no desire for arbitration and would probably not abide by the result.

On Monday, Mr. Penwill was asked if he or members of his organisation had at any time tried to influence members of the union

to remove union officials from office. He replied "No," but agreed that last year he had urged employers to suggest to their staff that they should take an active part in the union affairs and so get rid of "disruptive elements."

Referring to the relations between the employers and the E.T.U. "he had noted a deterioration since 1947 or 1948. They were conscious of an extremist policy which was being preached from the top, and particularly among some area officials of the union." Replying to Mr. Phillimore, he said that at the meeting on August 31, the association felt that the wages already being paid were adequate.

Answering Mr. Phillimore's questions, Mr. S. L. M. Barlow, president of the association, said he attended the meeting on August 12; he thought that if arbitration had been suggested at that stage the matter would have broken down entirely. His own company was the first to be affected by the strikes, but he and the Council were of the unanimous opinion that there was no justification for increased wages. Later he declared that at his own company the strikers did not come out until they were winkled out.

In his closing address Mr. Stevens maintained that his own evidence showed that again and again at Council meetings they had asked "how much?"—but without ever getting an answer. The action of the employers in refusing the claim for an increase was based on two main factors. The first was political considerations, and the second was what appeared to be quite definitely an attempt to undermine the leadership of the E.T.U. He felt more than justified in saying that if there were any political motives whatever in this dispute it had been the employers who indulged in them and not the union.

Finally, Mr. Phillimore said it had been suggested on behalf of the union that they really wanted to observe the negotiating machinery in the industry and pursue this dispute by negotiation. But he maintained that their actions were completely inconsistent with their words. The dispute could have been resolved peacefully by arbitration. But it had been so conducted by the union as to render its settlement by peaceful means as difficult as possible.

The chairman stated that the finding would be announced in due course.

Glen Lussa Inaugurated

THE North of Scotland Hydro-Electric Board's Glen Lussa project, which was officially approved by Parliament in January, 1948, was formally inaugurated on Thursday last by Mrs. Rose Martin, daughter of Mr. Neil S. Beaton, one of the original members of the Board. The station contains two 1,200 kW English Electric turbo-alternators operating on a head of 380 ft. The first machine went into operation in February 1952, but two months later the Board announced an extension to the scheme designed to increase the project's output by about 2¼ million units annually. When this extension is completed the annual average output of the station will be about 10¼ million units.

The original scheme had a catchment area of some 13 miles. The extension brings in the upper reaches of the Barr Water. All the waters of the catchment area are impounded by a concrete dam 260 ft. long, the arch section of which is 160 ft.

From the dam the water is led through a tunnel to a low-pressure pipeline 2¼ miles long which gives way to a high-pressure tunnel leading down to the generating station in Glen Lussa. At the ceremony last week, Mr. Thomas Johnston, chairman of the Board, said that when the Board came on the scene five years ago, the region, which was now termed the Board's Dalriada area, had 2,574 consumers, and now there were 6,302.

Improved Outlook in N.Z.

WITH a predominantly domestic load, the Hutt Valley Electric Power Board, New Zealand, were obviously pleased at the lifting of electricity rationing and control some months ago when the new Maraetai hydro-electric station came into operation. The report of that Board for the year ended March 31 last, however, shows that the total number of units sold during that period, at 154·3 million, was only 3¼ million higher than for the previous year. Of that total, the 26,057 domestic consumers took 99·1 million, providing a revenue of £263,751 out of the Board's total revenue of £485,193 for the sale of electricity. Over 58 per cent of the consumers already have an electric cooker, while the percentage of those with an electric water heater is more than 61 per cent.

Sales of houshold appliances have shown a steady increase, and during the year a further 1,295 electric cookers and 1,365 water heaters were installed.

Operations for the year under review resulted in a net surplus of £5,493, which the chairman, Mr. J. Purvis, considers is too small a margin for an undertaking subject to the vagaries of today's costs. Indeed, the Board faced its current year with increased charges for its bulk supply, and consequently had to raise the domestic tariffs by about 34 per cent and those for commerce and industry by 33-40 per cent.

From AN ENGINEER'S NOTEBOOK

IT seems such a short while ago that the discovery of cosmic rays created its own scientific sensation, that I find it difficult to appreciate the far-reaching effect is has had on fundamental thought on physics. These rays have provided a whole new range of unstable particles with a never-ending complexity of change from one to another. What is more, their high energy levels, particularly at high altitudes, have, it seems to me, provided a spur to those concerned with particle accelerators, to design equipment capable of accelerating particles to equal or even higher energy levels. The cyclotron early reached its limiting value due to the loss of phasing consequent upon the relativistic effect, and now this is being overcome by variation of the frequency or field or possibly both so as to provide ever larger machines. But these with their special housings and magnets weighing thousands of tons are limited by high capital cost. For this reason attention is once more being given to linear accelerators. The extension of such machines to provide higher energy levels has been made possible by the great advance that has been made in short-wave radio technique. One of the most promising of the new approaches is the acceleration of electrons on the crest of a pulse travelling down a wave guide, a technique developed at the T.R.E. at Malvern. An accelerator of this type capable of giving 1,000 MeV is expected to be working soon in America, and one cannot but wonder whether this type will surpass the rotational type accelerator in the race to reach the energies of cosmic rays which may reach as high as 100,000 MeV.

* * *

THOSE who have had the experience of steel sheet fracturing in presses, will know that one of the causes may be due to uneven dispersal of impurities in the original ingot. In cooling from the outside, the purer metal solidifies first to form the outside of the ingot, the impurities being driven to the centre. Thus is formed a core of metal having a higher percentage of impurity and in consequence a greater hardness. Whatever heat treatment is adopted, this section of harder metal will be carried through the various rolling operations to give an unsatisfactory sheet for pressing. Of course, metallurgists have found an answer to this problem by dispersal of the impurities during cooling, but what interests me is that this same difficulty has been turned to good purpose in obtaining germanium of that super purity which is required for electrical and physical purposes. By a double distillation process a high standard of purity can be obtained, with arsenic, one of the principal impurities, limited to 0·05 parts per million. Where even higher purities are required the technique of migration of impurities is adopted. A small local zone of the bar of germanium to be purified is heated to melting point and this zone of molten germanium is then traversed along the bar, taking with it the traces of impurities still present, in much the same manner as in cooling a steel ingot. Finally, one is left with a germanium bar with the impurities congregated at one end, which is cut off for chemical refining. This, I think, is a good example of how science can utilise in one sphere a phenomenon so troublesome in another.

* * *

ONE of the fascinating sides of science is to me the odd quirks and twists which one finds in physical phenomena. Perhaps the best-known example of what I mean is the sudden change of direction of the density/temperature curve of water at 4° C. Why this sudden twist just before the point where water becomes solid? It seems so irrational in the ordered world of science. In similar vein, a few years ago tests on the velocity of sound at low pressures were reported to have shown an increase in speed at pressures below 15 cm of mercury. At 5 cm it was found that the velocity was several metres per sec. higher. Now, however, a further investigation has indicated that the velocity of sound is constant down to 5 mm. of mercury. It would seem probable that the lack of correlation between the two tests may be accounted for by the differing application of correction factors for the method used. It is to be hoped that this difference will be clarified, for in these days of supersonic and stratospheric flight, any variation in sound velocity may be significant. While I am perhaps sorry to lose one of my "twists," life is much simpler if our physical constants are constant.—*E.R.G.*

Belfast to Seek New Tenders

FRESH tenders are to be obtained by Belfast City Council for the supply of boiler plant for the West power station. This was decided upon at a special meeting of the Council last week when the recommendation of the Electricity Committee (to which we referred on September 17) was rejected by 25 votes to 23, and an amendment moved by Alderman M'Kee was approved. This amendment provided that notwithstanding the Committee's determination of special consideration, tenders for the boiler plant should be invited by public advertisement.

In moving the adoption of the Electricity Committee's recomendation, Councillor Geddis said that special circumstances existing in November and January justified a departure from the normal procedure of advertising for tenders. Time was much shorter now, and the only chance of having the first turbo available by the 1956-7 winter was to complete the arrangements without further delay.

But Alderman M'Kee maintained that despite all the earlier discussions, the Committee had decided to stand or fall by recording a special circumstance in relation to one matter only—that was the question of time. "Yet could they honestly say that in January last the Committee had not enough time to invite tenders from 12 firms instead of 5?" he asked. The Committee also seemed to be under the impression that they must listen only to Messrs. Merz and McLellan, he went on. That was not so. They were equally bound to have regard to all the evidence put before them, such as the submissions of Mitchell Engineering, and the evidence of the B.E.A. and an independent firm of London consulting engineers.

After other members had referred to a likely saving, Councillor Macgougan declared they had got off the rails in not advertising for tenders and they had to get back even if it meant several months' delay.

The following day, Alderman M'Kee was awarded costs in his action in the High Court against the Corporation (which we reported on September 10).

THE MARKET IN PORTUGAL

WITH a number of large hydro-electric schemes still under construction, Portugal would seem to offer a first class opportunity to British manufacturers. According to a report prepared by the Commercial Counsellor and Consul General at the British Embassy, Lisbon, the main cities of Lisbon and Oporto between them supply about 350,000 of the 600,000 consumers in the country. Oporto, although smaller than Lisbon, is considered the more important market for electrical appliances, for the electricity tariffs are comparatively low.

An indication of the Lisbon market may be gained from the fact that in 1951, the Lisbon Gas and Electricity Co. under its extended payment system alone sold 5,300 electric irons, 727 cookers, 529 hair dryers, 642 washing machines and 542 shavers.

It is evident that nearly all these appliances were imported, for local production is confined to the simpler apparatus such as irons. The bulk of the business is done through import agents acting on their own account, both as wholesale and retail distributors. The most noteworthy increase in imports has been in respect of washing machines, of which about 80 per cent. came from the U.K. in 1952.

APPLIANCES IMPORTED INTO PORTUGAL DURING 1951 AND 1952

Exporting country	Washing machines				Vacuum cleaners and floor polishers			
	1951		1952		1951		1952	
	No.	Value (£)	No.	Value (£)	No.	Value (£)	No.	Value (£)
U.K.	1,703	26,907	2,240	42,501	1,035	10,189	2,114	22,055
Sweden	19	2,693	15	3,844	1,709	27,159	1,585	27,778
Germany	43	1,500	168	5,294	134	1,736	501	6,262
France	14	1,089	48	2,324	—	—	108	1,348
U.S.A.	19	940	103	5,432	—	—	18	202
Holland	—	—	—	—	909	10,128	1,022	10,901

A.P.L.E. Discuss Lantern Design

The third session of the Conference was devoted to a paper by M. H. Mounsdon on Lanterns in the Making

ESSENTIAL considerations in both design and manufacture of standard main and side road lighting units provided the material for discussion when the A.P.L.E. Conference reassembled last Thursday morning. In his paper "The design and manufacture of street lighting lanterns," Mr. M. H. Mounsdon (The General Electric Co.) directed his attention solely to standard units designed for quantity production. With such lanterns, the ultimate output justifies tooling up and considerable development work, final assembly being assigned largely to semi-skilled labour. It follows therefore that continuous production of a range of lanterns, if a satisfactory result is to be ensured, demands considerable organisation and supervision, and their design calls for a clear understanding of workshop processes and limitations.

Mr. M. H. Mounsdon

In the first stage of the design of a lantern is found the optikon, the optical arrangement of reflectors or refractors by which the light from the lamp is re-directed into a predetermined distribution. It should be borne in mind, however, that although it may not be possible to place re-directing surfaces in the path of all the light issuing from the lamp, any part in the lantern which receives light will have some influence on the final distribution.

A start is made by considering the various types of optikon available and the lamps which are to be used, as they may carry restrictions on their method of use. In deciding whether refractors or reflectors are to be used, consideration has to be given to manufacturing. Reflectors, although easier to produce than refractors, in that less machining with more amenable materials is involved, demand a high degree of accuracy in manufacture and assembly to ensure consistency between successive lanterns. Glass or plastic materials on the other hand, require no more than ordinary tool-making skill for manufacture, whilst the position of refractors with relation to the lamp is less critical for consistency. Basically however, a new lantern is introduced to make use of a new source, to exploit a new optical system or to take advantage of a new material or manufacturing technique.

Having decided upon the type of optikon, a mock-up is assembled for photometric testing, and adjustments made until a satisfactory performance has been obtained. When this position has been attained, the layout is then recorded in the form of a drawing. Armed with this drawing, British Standard 1788 (which lays down mechanical requirements in lantern manufacture) and lamp and lampholder data, the design may then be completed on the drawing board.

Briefly, the design must provide a weatherproof covering and support for the lampholder, with means for holding the optikon in its proper position, capable of resisting weather attack for at least 15 years. Two main types of canopy are available, those which are circular in plan, symmetrical about a vertical axis and employ small or vertical sources, and those which are non-symmetrical using horizontal sources. The former have shown a tendency to simplification in recent years, now consisting usually of a one-piece body casting with provision for attaching lampholder and its adjusting mechanism. The latter may also consist of a one-piece top casting, to which all else is fixed, or they may be built up.

An important factor in any design is the relationship of lamp to optikon, which means considering two lamp errors. The source may be in the wrong place along the axis of the lamp—most frequent in filament lamps—or the lamp axis may be other than perpendicular to the lampholder mounting surface.

To minimise their effect requires that the surface on which the lampholder is mounted is related correctly to the optikon mounting surface. Hence manufacture of parts between these two key surfaces must be accurate to avoid cumulative errors.

Finally maintenance requirements, particularly for lamp details pose their own problems. A quick and positive fastening for the lantern hood is required to ensure its easy opening and closing under all conditions. Hinges should ensure good location of mating surfaces and fastenings. For the latter, the wing nut and swing bolt have their value, but in recent years a toggle type has grown popular for its ease of operation and high leverage available which overcomes any stiffness due to corrosion or paint.

DISCUSSION

Discussion on Mr. Mounsdon's paper was opened by W. F. Griffiths (Crompton Parkinson) who, in congratulating the speaker, pointed out that in any installation, the lanterns were a small proportion of the total cost but unless they operated successfully the prime purpose of the installation failed. It was one thing to produce a lantern but another to produce one to last for 15 years and here the author had been correct to emphasise the value of the scrap heap, as a source of practical information.

No mention had been made, however, of aesthetics in lamp design which is surely a basic design consideration. Not only should the fitting look well as a separate unit but its appearance must blend with that of the support. Apart from this aspect there were further factors affecting design: storage and transport as both user and erector had to store lanterns at one time or another whilst in many cases long, perhaps even oversea, journeys were involved.

The question of lantern cost as a part of the total was raised by F. H. Pulvermacher (South Wales Electricity Board), who rated it fourth in the user's estimation of lantern quality. Primarily, a user desired suitability for giving correct light distribution and for ease of maintenance, whilst second and third in importance were care of mounting and daylight appearance respectively. Since cost was a lesser factor, it was folly to "spoil the ship for its ha'porth of tar"—a saving of £2 in a total lantern cost of £50 might mean a 30-40% fall in efficiency. Among other suggestions he made—such as a comprehensive catalogue from manufacturers, maintenance requirements, and greater use of the Council of Industrial Design—the concluding plea for the annual award of an "Oscar" for the best lantern provoked most reaction!

Other comments were confined largely to questions seeking detailed information except that perhaps by M. V. Osmond, representing the Council for the Preservation of Rural England, who in his concern over the disproportion and lack of harmony between lantern and mounting sought to know at what stage in production is there any liaison between lantern and column manufacturers—a question which, as Mr. Mounsdon remarked in reply, might better have been answered by the opening speaker.

In the left-hand illustration are seen the President, Mr. C. C. Smith, and Mrs. Smith, the Deputy Lord Mayor of Liverpool, Alderman Morrow, and the Lady Mayoress. Right, the President, with Mrs. Smith, is seen receiving his niece, Miss Scotson, with Mrs. Scotson, the Deputy Lord Mayor and Lady Mayoress

A.P.L.E. survey Belgian Public Lighting Practice

An interesting comparison of produce in this country with that of Belgium was afforded by this paper by

M. A. Boereboom

THE paper read to the conference on Thursday afternoon provided a useful means of comparing practice in this country with that in Belgium. Under its title "Public Lighting in Belgium," Mr. A. Boereboom (General Director of Electricity and Electromechanics, Ministry of Public Works, Belgium, and President of the National Commission of Public Lighting), surveyed different aspects of the subject, the emphasis naturally being on street lighting. Particular attention was drawn to fluorescent fittings.

In the main, an increase in traffic density of two to one in the last ten years, primitive lighting still used in many towns and villages and the introduction of discharge lighting and fluorescent lamps of higher efficiency, brought about this rapid growth of street lighting installation. Energy costs still average approximately 3½d./unit, one of the reasons for the poor street lighting in many rural communities. Only in the larger towns were mercury vapour and flourescent lamps first used (resulting in a considerable rivalry) but the smaller communities soon followed. Competition between principal manufacturers provided a further stimulus.

Difference in Practice

Briefly, the major differences between British and Belgian practice lies in the use of lower power lamps (most common lamps are 85W sodium, 80W fluorescent high pressure mercury and 40W fluorescent tubular lamps, although lamp sizes show a tendency to increase); the general use of the cut-off type lantern; central suspension for most fittings; and, until recently, poorer design of columns. In the latter however, substantial efforts are being made to improve design and finish—with pleasing results.

Responsibility for lighting roads rests entirely with Local Authorities although the State may intervene by providing a subsidy of approximately 30% of the first installation. The installation, to benefit from this assistance, must comply with conditions laid down in the Code for good lighting practice on main highways. Drawn up in 1952, this code was produced by a sub-committee of the National Belgian Lighting Committee, approved and edited by the Belgian Standards Institute, and although not a rigid set of rules, makes recommendations based on principles of security, comfort, economy, aesthetics and direction.

Road Safety

One of the primary concerns of Belgian public lighting is road safety, which, in terms of persons killed/100,000 cars, has improved by nearly two to one in the last five years. Consideration has been given to lighting traffic routes along their entire length, priority being given to roads of night traffic density of greater than 200 vehicles/hr. Financial limitations however, have permitted, to date, no more than a trial installation over a 50 km. section of the road between Brussels and Antwerp and, on other roads, the lighting of particularly dangerous places.

Among other aspects of Belgian public lighting which stand out is the now extensive use of fluorescent lamps for road lighting. One town, Charleroi, is lit entirely by this means—probably the first European town to have adopted fluorescent lighting to the exclusion of all else. Floodlighting also is popular, and has proved its value in increased tourist traffic. One type of installation is the floodlighting of bridges crossing the Brussels-Ostend traffic road, providing the traveller with a welcome relief from monotony and and some indication of his position. Another facet of bridge lighting has been "built-in" fittings along the parapet to provide satisfactory road brightness without the erection of columns to detract from the architectural design of the bridge.

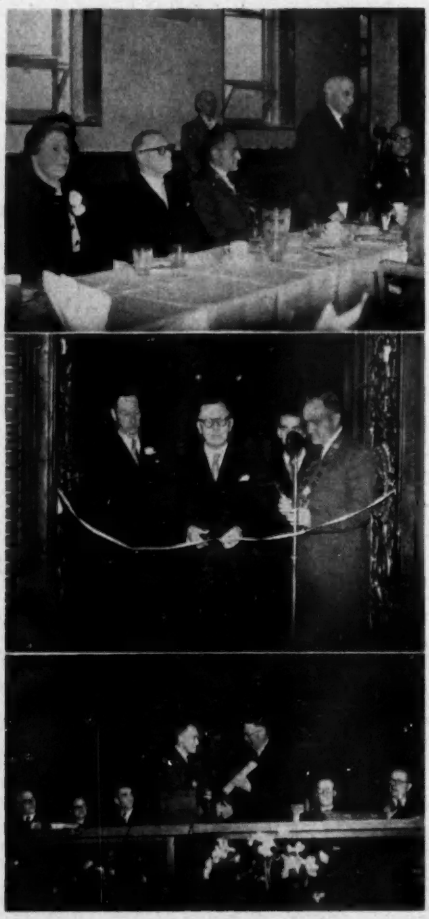
DISCUSSION

Mr. E. C. Lennox, of the North-Eastern Electricity Board, initiated discussion, praising the paper as a means of comparison between the two countries' practices. For example, a new 125 W, h.p. fluorescent mercury source was being shown in the exhibition, yet Belgium had had these lamps for several years. The Belgian practice of tilting fittings at 15° to the horizontal, whose benefit Mr. Boereboom had pointed out was illusory, was also to be found in a new lantern on show.

On finance, he found that neither the 30% granted in Belgium, nor the 50% (for main road lighting only) granted in Britain to be adequate if equated to the cost of road accidents. The higher danger element at night was ample evidence of the need for further lighting, which would probably be provided at approximately £3 million in this country, whilst insurance companies were involved in expenditure totalling £150 million p.a. as a result of street accidents. If these companies could be persuaded to grant interest free loans to lighting Authorities, the saving in insurance expenditure attendant on improved lighting would probably more than compensate for the absence of interest.

A method of drawing public attention to the problem was to be found in the coroner's court, he suggested, if a competent, but independent, lighting engineer could be called in to give opinion on the quality of the lighting at the scene of the accident. On another topic, he drew from Belgian experience with fluorescent lighting the moral that Britain was not exploiting this medium adequately.

On Friday morning this year's Conference was brought to a close by a further paper in a general series "Know your materials." Presented by Mr. W. H. Lythgoe, of the C.M.A. Its concern was electric power cables, whose manufacture was described from the initial stage of a raw copper rod, and raw rubber, to the finished article, with profuse slide illustrations throughout.



The upper picture shows Sir Harold Hartley speaking at the annual luncheon, with Mrs. Smith, the Deputy Lord Mayor, the president and Mr. H. Pryce-Jones. Centre is seen the opening ceremony being performed by the Deputy Lord Mayor, with Alderman Critchley (chairman Liverpool Lighting Committee), Mr. Evans (secretary A.P.L.E.) and the president. Lower is seen the new president being inducted, with members of the council

Below is seen a group at the president's reception. (From l. to r.) Mrs. Howard, Mrs. Doxey, Mrs. Evans, Snr., Mr. E. Howard (immediate past president), Mr. G. Kelly, Miss Evans, Mr. M. A. Doxey (vice president). Mrs. Kelly, Mr. G. Pollard and Mrs. Pollard

A.P.L.E. Annual Luncheon

THE Annual Luncheon of the Association, held at Lewis's Restaurant, Liverpool, was marked by its being the first luncheon to be served there. In a nostalgic mood, Mr. H. Pryce-Jones, M.Eng., M.I.C.E., M.I.E.E., a Past President of the Association, proposed the toast to the City of Liverpool and the Guests. Seventeen years of his life had been spent in this city which had produced some famous sons and daughters. In reply, Alderman Morrow, J.P., the Deputy Lord Mayor, made humorous reference, by implication, to the recent British Association Meeting.

Sir Harold Hartley, K.C.V.O., C.B.E., F.R.S., proposing "The Association of Public Lighting Engineers," felt it a privilege to say how much the public in general owed to the Association for its lighting and for its safety. From the days of lamplighters he had watched the development of lighting to its present position, a development which was due not only to scientific research but the competition between gas and electricity. He felt pleased that this incentive existed.

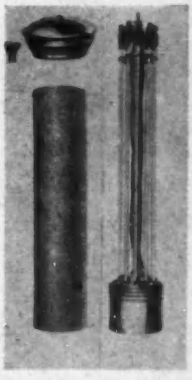
Responding, the President, Mr. C. C. Smith, A.M.I.E.E., commented on the growing strength of the Association, which was not surprising when accident and crime figures give such cause for alarm. Such aspects were not the least of Public Lighting Engineers' tasks. In the main, however, the credit was due to the research engineer.

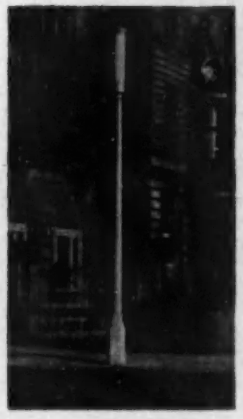
NEW LOOK AT PIER HEAD

COINCIDENT with the A.P.L.E. Conference in Liverpool last week was the inauguration at Pier Head of a lighting installation believed to be the first of its kind in existence. It employs cylindrical pole top lanterns utilising vertical cold cathode tubes designed by the General Electric Co., the layout and installation being undertaken by the City Lighting Dept. under the Lighting Engineer, Mr. C. C. Smith, A.M.I.E.E.

One of the factors influencing the decision to install cold cathode lamps was that of maintenance. High winds are often encountered, even at relatively calm periods, at this exposed site, and such weather makes work on streetlighting fittings well nigh impossible. The absence of starting gear, combined with the long life of this type of lamp—15,000 hours is an estimated figure—and reliability under conditions of fluctuating mains voltage permits the manufacture of a completely sealed lantern.

Designed for post-top mounting at a column height from 15 to 24 ft spaced at intervals between 100 and 150 ft, this new lantern is at Pier Head mounted on 24 ft lanterns its light centre being approximately 27 ft from the pavement. In all 50 lanterns are to be installed and so far six have been erected. Light output from each lantern—housing five 67½ W U-shaped "Osram" lamps—is stated to be equivalent to that from four, 5 ft 80 W hot cathode fluorescent tubes or a 400 W high pressure mercury vapour lamp. Throughout its life, the average efficiency of each lamp is claimed to be 35 lumen/Watt.



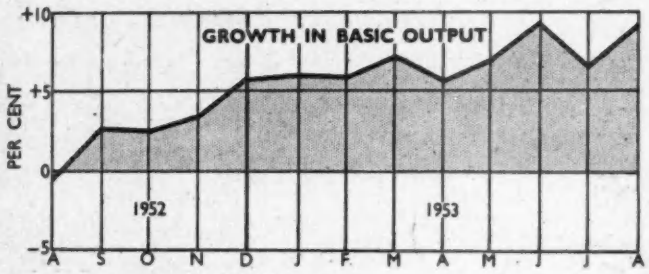


Here is seen the lantern as it appears outside the Royal Liver Building, and, left, its construction and assembly are shown

In construction the lantern is built round a central steel tube which at its lower end is screwed in a spigot ear. Enlarged to the full lantern diameter, the latter houses the lamp transformer which is protected by an aluminium case carrying a Sorbo rubber gasket in a channel in its upper edge for seating the needed Perspex outer cylinder. Mounted toward each end of the central tube are two spiders fitted with glass insulated clips holding the lamps. At their upper electrode ends these lamps are screened by the spun cover, the leads being taken down the interior of the central tube to the transformer.

BASIC LOAD GROWTH

In the accompanying curve is shown how energy sold by the B.E.A. in the past 12 months compares with that of the corresponding month a year earlier. Figures used for plotting are first corrected for the effects of temperature and of the number of working days included in the calendar month. Thus the points marked are an approximate measure of the basic rate of load growth experienced by the B.E.A.



Power Supply in August

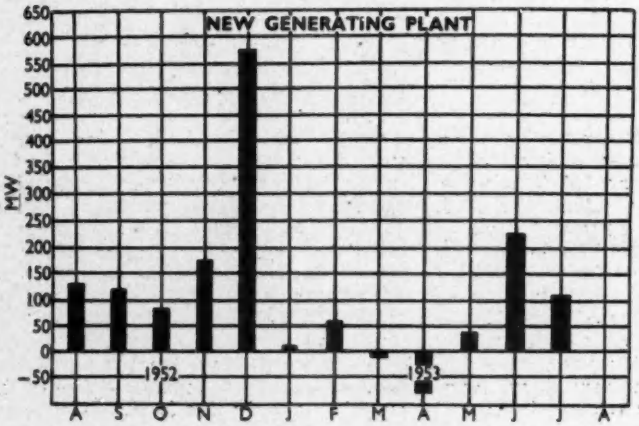
PLANT commissioned by the B.E.A. last month was confined solely to boilers, as may be deduced from the appearance of the graph below of new generating plant. Two boilers only was the sum total recorded, of which one was the first boiler for the new Carrington Station, Manchester, in the North-Western Division. A Babcock and Wilcox unit, the boiler rating is 360 klb/hr at the standard t.s.v. steam conditions of 900 lb/sq in. 900° F. As a first step four of these units are to be commissioned, to be used with two 60 MW sets supplied by Metropolitan Vickers. The second boiler to be commissioned last month was a 250 klb/hr unit of Foster Wheeler manufacture, for Deptford East Station in the London Division.

Sales in August

Sales last month again exceeded those of the corresponding month last year in all areas. The highest increase, that of 13·9%, was shown in sales by the North-Western Board, a clear indication of the now happier

B.E.A. SALES TO AREA BOARDS IN AUGUST

Board	August total in million units	% inc. or dec. on August 1952
London	335·9	+ 5·2
South Eastern ...	214·5	+ 8·8
Southern	255·1	+10·1
South Western ...	128·4	+ 9·6
Eastern	350·8	+ 9·0
East Midlands ...	301·5	+ 8·5
Midlands	378·4	+ 7·1
South Wales ...	248·6	+10·1
Merseyside and N.W.	244·1	+ 8·2
Yorkshire	397·4	+ 5·3
North Eastern ...	255·1	+ 8·0
North Western ...	471·7	+13·9
South-East Scotland...	90·9	+ 7·7
South-West Scotland	210·8	+ 9·8
Direct Sales	83·2	+37·1
Grand Total ...	3,966·4	+ 9·1

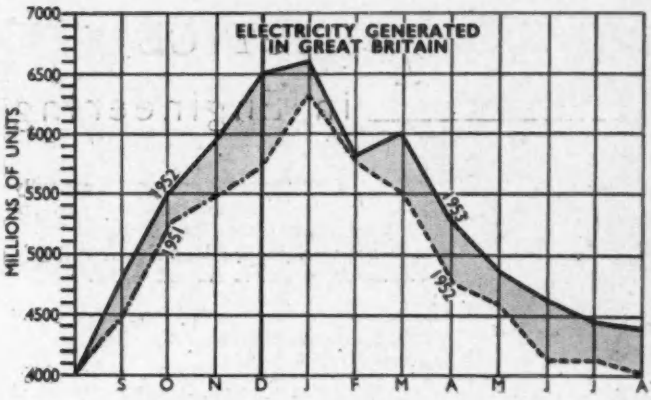


GENERATING PLANT

At the end of August, 1953, the installed capacity of the B.E.A. was 17,510 MW, showing no change at all during the month. During the same period that of the North of Scotland H.E. Board also stayed constant at 565 MW.

The overall increase during the past twelve months is 1,280 MW or 7.6% of the total at August 31, 1952. The B.E.A. total is up by 1,275 MW and the N. of S. total by 5 MW.

The total installed capacity used for the purposes of this graph is the total m.c.r. of all generating sets which are connected on both steam (if appropriate) and electric sides and are suitable for service.



UNITS GENERATED

Total generation during August amounted to 4,391 million units in stations under the control of the British Electricity Authority and the North of Scotland Hydro-Electric Board. Last year's corresponding figure was 4,001 million units.

Of the August total, 4,300 million units were generated in steam stations, whilst the contribution from hydro-electric stations was 79 million units.

Energy sent out by both authorities during the month totalled 4,118 million units, 93.8% of that generated.

position of the textile industry. On a national basis, weather conditions were warmer, an average of 62·2° F compared with 61·9° F for August, 1953, which may have played some part in the increased sales. When corrections, however, are made for temperature and the effective number of working days (27·41 this year as against 27·23 last), it is seen that the national increase in sales is 9·3%, compared with 9·1% actual. This figure, which represents the basic growth in load, is an encouraging sign that demand for energy is again increasing on a rational basis. The curve of basic load growth shows the variation of this figure during the last 12 months, whilst for the years ending 31st March in 1952, 1951, 1950 and 1949 it has been 6·5, 11·1, 8·6 and 8·3% respectively.

Figures for the North of Scotland Hydro-Electric Board, although uncorrected for such factors, show an increase in sales to areas of 15%. Increases of this order have been maintained consistently over the last few months and provide an indication of the Board's development in areas under its aegis.

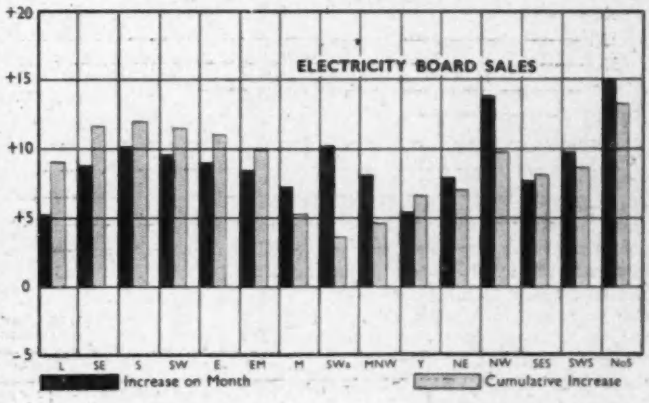
Coal Stocks

Power station coal stocks during August averaged 5·41 million tons, as against 6·03 million tons for the same month last year. This difference, of approximately 600,000 tons, has maintained more or less constant throughout the month, after the previous two months when the difference gradually grew from one-third of the figure to its present value. Weekly consumption of coal has been higher, a fact implied by the units generated curve, which for the two years indicates a constantly higher energy output. Coal consumption, standing at 460,000 tons/week at the beginning of August, rose to 600,000 tons, compared with last year's figures of 430,000 tons/week and 570,000 tons/week respectively. On a national basis, coal stocks have been consistently lower, and consumption higher than during the summer of last year.

AUGUST SALES

Progress in the sales of energy by the British Electricity Area Boards and by the North of Scotland H.E. Board is represented in this diagram. For each entry the two columns indicate, respectively: the bulk supply of electricity taken by the Board (or the total sent out to Areas for the North of Scotland) in August, 1953, expressed as a percentage increase on that in August 1952; and on the same comparison for cumulative totals based on the financial year.

It should be noted that the B.E.A. financial year runs from April 1, whilst that of the North of Scotland H.E. Board corresponds to the calendar year.



PROBLEMS AND PRACTICE in Engineering

Bad Earthing

RECENTLY I received a call to rectify a fault on a plug feeding a refrigerator. On arriving at the premises I found a fuse blown, due apparently to a short circuit. On renewing the fuse, having failed to locate the fault without test instruments, a large flame appeared momentarily in the middle of a length of lead cable as it crossed a conduit carrying cables to a switch; the lead cable was a feed to a separate plug control ing an iron.

On further inspection it was found that the refrigerator plug was bonded to the switch conduit, which was soon discovered to be without an earth. An earth fault on the refrigerator passed through the bonding wire to the conduit, then jumped to the lead sheathing of the ironing plug as it crossed the conduit, so completing the path to earth. The flame I saw was the melting of the lead sheathing, which, after renewal, and clearance of the fault, left only the conduit to be properly earthed, so avoiding a recurrence of these dangerous conditions.—*D. H. Stewart.*

Ceiling Roses

CAN any of your readers give a satisfactory method of unscrewing jammed porcelain ceiling roses? So far I have tried practically every conventional engineering method but have always ended up by having to smash the roses and replace them by complete new assemblies or plastic type.—*W.H.*

Bearing Damage

IT is well known that damage to ball and roller races of large motors can occur during shipment, and much research and experiment are being carried out to minimise this damage by locking the shafts or by the introduction of special packing pieces. It is not however quite so widely appreciated that damage can occur to motors which are subject to vibration on site. In some cases spare motors, stored in areas where vibration and shock are transmitted from other plant or machinery, have had bearing troubles shortly after being put into operation.. This can be avoided in many instances, where standby motors are located for convenience near to vibration sources, by standing the motors on blocks of resilient material.

Such circumstances do not admittedly occur frequently in this country, but are fairly common abroad where replacements must necessarily take a long time in delivery, and repair on site is difficult.—*J.A.P.*

Unexpected Tripping

OUR manually operated oil circuit-breaker, rather old in years, developed a tendency to trip out on the out of balance protection without apparent cause. The protective arrangements were carefully surveyed and found to be satisfactory, as also was all the auxiliary gear. The tank was therefore dropped and the contacts examined. These, too, were in good order. It was then noticed that the insulated bar carrying the moving contacts was out of alignment permitting one of the phases to close well after the other two. If the switch was therefore closed comparatively slowly, and the design permitted a fair variation in speed, the first two phases were connected early enough to permit the out of balance protective gear to operate the tripping relay. A smart and rapid closing however could beat the relay and the switch was apparently satisfactory in those conditions. After realignment the unit of course was perfectly satisfactory.—*P. J. Benson.*

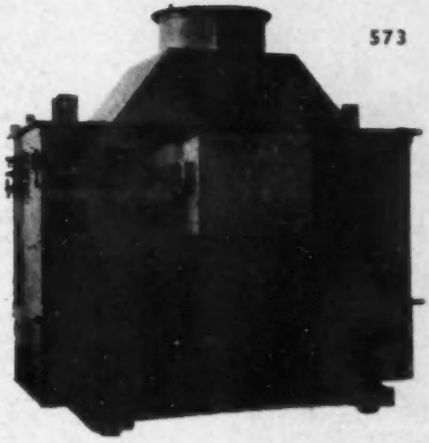
Permanent Records

AN old and simple method which I have found suitable for making permanent records of connections in complex distribution boxes, may be of interest to some of your readers. A thin sheet of brass is lightly coated with wax or candle grease and the circuit scribed through the coating with a sharp, pointed tool. The surface is then covered with hydrochloric acid and the circuit etched into the brass. Such a record is permanent and unaffected by age or decay, and can be included in the box or screwed on to the cover.—*P.R.G.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

Air-Cooled Transformers

Oil free units compare favourably with more conventional designs



AIR-COOLED transformers have, of recent years, been found to have many special applications where the use of oil as a cooling medium has not been desirable because of site or operating conditions. For the past 15 years Transformers (Watford) Ltd., have been steadily developing this type of transformer, with the result that designs are now available up to 5,000 kVA, 11 kV. Units of 750 and 2,000 kVA, 6·6 kV ratings have recently been installed in a large rubber producing plant overseas. The transformer illustrated in Fig. 1, which is believed to be the largest dry type unit produced in this country, compares very favourably with developments in the U.S. where dry type units are used more extensively than over here, on account of more stringent regulations on the use of oil-immersed equipment.

One of the main features of the T.W. air-cooled unit is the use of wide and unrestricted axial vertical cooling ducts so arranged that, in operation, dust and other accumulations present no problem. Another point of much interest in connection with air-cooled transformers is that of overall size. The comparison in Table 1 is of interest here, and it also shows some efficiency comparisons.

Most of the dry type units built so far have, of necessity, been for indoor operation, as their service position has demanded elimination of oil. It is interesting to note, however, that Transformers (Watford) Ltd., have now received a contract for the supply of 300 kVA, 11 kV units for outdoor operation. This will, of course, necessitate special technique in both design and manufacture, particularly in view of the possibility of periods during which units may be left unenergised.

Fig. 1 (Above). *This 2,000 kVA, 6·6/3·3 kV air-cooled transformer has fire-resisting windings*
Fig. 2 (Below). *Rated for 200 kVA, 11 kV/400 V, this air-cooled transformer has given 12 years' service with no sign of trouble*

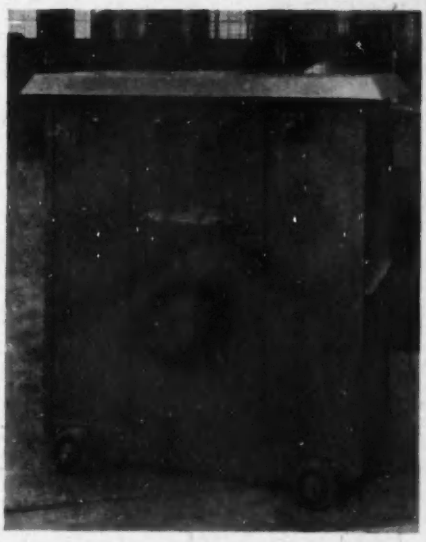


TABLE I. COMPARISONS OF TRANSFORMER DIMENSIONS AND EFFICIENCY

Transformer	Length in.	Width in.	Height in.	No-load loss, kW	Copper loss, kW	Total f.l. loss kW
200 kVA, 11 kV air cooled ...	58	46	60	1·04	2·96	4·00
200 kV, 11 kV to B.E. Spec. T.I.	60	53	65	0·86	3·40	4·26
2,000 kVA, 6·6/3·3 kV air cooled	110	60	111	6·60	17·40	24·00
2,000 kVA O.N.	96	74	131	5·55	20·10	25·65

overseas news

B.C. Link

Work is now in progress in British Columbia on bridging the 11-mile gap that separates the Consolidated Mining and Smelting Co.'s Waneta power project and their power system in Trail. Three transmission lines are being erected in readiness for the operation of the power plant, which is expected to be early in 1954. The Waneta plant will initially have a rated turbine capacity of 210,000 h.p. Lines and switching station at Trail will cost about $1·9 million. Three long spans will be needed along the 11-mile route. The first will cross the Pend-d'Oreille River spanning a distance of 1,515 ft from poles on the east bank to poles on the west bank. The second span will cross the Casino Creek gully, a distance of 1,133 ft, and the third of 1,707 ft, will cross Trail Creek gully.

Alternative Power Source?

Within 245 years, the world must be prepared to utilise 1% of all incoming rays from the sun to provide heat and power for home and industry, it was predicted at a three-day conference on solar energy, held at Madison, Wisconsin, U.S.A., last week. Usable supplies of coal, gas and oil will be exhausted by the year 2023, according to an estimate made for the Atomic Energy Commission by Mr. P. Putnam. In an additional 175 years usable supplies of uranium and thorium, sources of atomic energy, would also be consumed, he stated. His predictions were based on the assumption that the world's population would continue to increase at the present rate and that the demand for heat and for power-produced articles would increase to the extent expected by the economic planners. Direct capture of solar heat had been accomplished to a small degree, but the problem was how to obtain such heat on a large commercial usable scale. Various methods were suggested, including the storage of heat in tanks containing chemicals that liquefy at solar temperatures and solidify to give off their heat at night.

Expansion in Sweden

The South Swedish electric power concern, Sydsvenska Kraft Aktiebolag, is to open a new power station next month at Aengabaeck. It will have a capacity of 7,000 kW and a yearly energy output of 30 million units. At the same time, extensions will be opened at the Majenfors station in Lagan, increasing its capacity from 5,000 to 10,000 kW and bringing its annual energy output up to 46 million units.

Kuwait's Expansion

To meet the enormous increase in demand for electricity which has been brought about by the progress and prosperity resulting from the operations of the oil industry, Kuwait is to have a new power station. Construction is already well advanced and it is hoped that the new station will be in operation next summer. The station will have four 7,500 kW turbo alternators, the boilers being fired by natural petroleum gas piped from the oilfield. The present diesel station is also being extended and by the end of this year its capacity will be over 5,000 kW. Bearing in mind that the peak load at January 1952 was only 400 kW, the subsequent increase in demand is evident. Kuwait town, where distribution is at 415/240 V a.c., is also to have modern street lighting. There are also future plans for h.t. transmission schemes to outlying districts in conjunction with extensions to the steam power station to meet an estimated demand of 80 MW by 1964. President of Kuwait's Department of Electricity is Sheik Jabir Al Ali Al Subah, the chief electrical and mechanical engineer, in charge of the work, being Mr. J. D. Addison, M.I.E.E.

Power for Jerusalem

The new transmission line from the Palestine Electric Corporation to Jerusalem is two-thirds erected, and should be completed by November, the Jerusalem Electric Corporation Ltd. has informed its consumers. Consequently power cuts are now unlikely. The company has also informed Mayor Kadiv that unless the city settled its debt of I£86,000 with the company very soon the power station would have to close, it is stated. About four months ago the municipality agreed to pay the costs of starting the station again and gradually to wipe out I£60,000 debt, but apparently these promises have not been kept. Further, the management of the Shimshon cement plant, whose power station has been supplying part of the capital's needs, has stated that they will not renew their contract with the Jerusalem undertaking after the new transmission line is operating. They maintain that in the course of five months the cement plant will require power generated at Hartuv for its own manufacturing operations.

Progress in Karnafuli

The two coffer dams under construction for Pakistan's Karnafuli hydro-electric scheme were not completed before the monsoon arrived, as was earlier hoped. But for trouble among the workers the two coffer dams would

have been completed. When the monsoon floods came the gaps between the two dams had been narrowed down to 70 and 40 feet, but these have now been widened by the flood which was rather early this year. According to the present schedule, the coffer dams will be completed by the end of this year when work on the main dam will be taken up.

Delhi Electrification

An ambitious programme for increasing electricity supplies in the city areas and for the electrification of new regions in the next five years has been drawn up by the Delhi State Electricity Board. Total estimated cost is Rs. 140.77 lakhs. By the end of 1957 it is proposed to fully cover the whole of the present urban area. For the purpose of the programme the whole area has been divided into two zones—(a) southern and eastern and (b) the western zone.

Surplus in W.A.

Operations of the State Electricity Commission of Western Australia for the year 1952-53, resulted in a surplus of £46,618 after charging interest and depreciation. The funded deficit is thus reduced to £215,203. Plant capacity was unchanged during the year, but units generated increased by over 26 million to 350.1 million. The metropolitan system showed a surplus of £98,220 for the year, but the South-West power scheme operated at a loss of £19,423 over and above the £72,000 received from the Treasury under the Act. Other country undertakings had a deficiency of £30,708 and there was a loss of £1,471 in the Albany gas works. Mr. R. J. Dumas, chairman of the Commission, has placed on record the members' appreciation of the business ability and technical direction of Mr. F. C. Edmondson, the general manager, in bringing the Commission's undertaking to a state of solvency. It was in 1949 that the Commission gave an undertaking to stand on its own feet and fund any future deficits until balance was reached. This is the first year that the Commission has made a surplus.

Tungatinah Expanding

The second 35,000 h.p. generator at the New Tungatinah power station of the Hydro Electric Commission of Tasmania, has now been placed in service. This brings the total installed capacity of the hydro-electric system in Tasmania to 360,000 h.p. The first unit at the newly erected Tungatinah power station has been in service since the first week in July. When the station is completed it will comprise five 35,000 h.p. generating sets, bringing the installed capacity of the station to 175,000 h.p. It is expected that the remaining three machines will go into service at intervals of three months, and that the station will be in full service nearing the middle of next year. Within the next two years the State's power output is to be stepped up to 576,500 h.p. with the completion of the Tungatinah and Trevallyn power schemes.

Power Production

Geothermal steam can be made available to produce power for an outlay of from £2 to £3 per kW, Mr. W. S. Goosman, New Zealand's Minister of Works, stated at the official opening of the Maraetai hydro-electric station this month. This contrasted with the cost of £35 per kW for a dam to raise the river levels sufficiently before hydro-electric power could be generated, he added. Cost of the Maraetai station worked out at £53 per kW. The latter station, with an ultimate capacity of 180 MW would have an annual output of 860 million units and would increase the production of power in the North Island by 40%. There was no intention, he said, of doing anything in the immediate future about the use of the Huka Falls and Aratiata Rapids sites. But there might come a time when a choice would have to be made between developing those two sites or the unpleasant alternative of cramping the national economy for lack of power.

Expansion Curbed

The Thames Valley Power Board, New Zealand, has had its application to borrow £70,000 reduced to £40,000 by the Treasury. This information was given at the Board's meeting earlier this month when it was stated that units sold during the year ended March 31 last totalled 87.7 millions, an increase of over 5%, despite the fact that more than 4 million units were shed by various means during the enforced restrictions. Average annual consumption per consumer was 4,816 units, a decrease of 1.1%. After placing £2,000 to general reserve and £7,350 to capital assets bought out of revenue, the net surplus for the year amounted to £17,116. Mr. Boughton, chairman of the Board, said that connection of the Kinleith paper and pulp mills and the attendant townships would bring a further increase in the development rate. Connected load had multiplied 3.58 times and units purchased 2.63 times over a 15-year period.

The Next H.E. Scheme

An early start is to be made on construction of the Atiamuri hydro-electric project on the Waikato River, the New Zealand Government has decided. Announcing this a few days ago, the Minister of Works, Mr. Goosman, said the construction team now completing the Maraetai station would be utilised. The proposal is to dam the river at a point near the present Atiamuri bridge, and to build a power station of 63,000 kW capacity, and a dam 125 ft. high by 570 ft. long. The station will have a normal operating head of 83 ft. and will house three Francis turbines. It will be situated a short distance downstream from the present Atiamuri bridge. For the design of the project, Sir Alexander Gibb and Partners have been engaged. This is the fifth project planned to utilise the Waikato River—Arapuni, Karapiro and Maraetai which are in operation, and Whakamaru, now under construction.

THE PRESIDENT and Chairmen

for the forthcoming session of

THE INSTITUTION OF ELECTRICAL ENGINEERS

IT is now only a few weeks to the Commencement of the 1953-54 session of the Institution of Electrical Engineers—the President's address will be delivered on October 8 but some of the sections are holding the first meetings earlier. As in past years, we present the following notes to provide a little background to the new president and the chairmen of the sections and local centres.

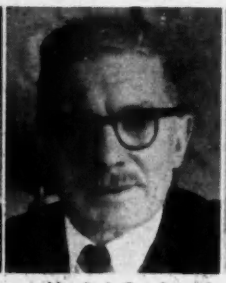
The new president, **Mr. H. Bishop,** C.B.E., F.C.G.I., B.Sc.(Eng.), M.I.E.E., M.I.Mech.E., F.I.R.E., has been associated with the engineering side of radio since its earliest days. His connection with the B.B.C. (of which he is now chief engineer) dates back to early 1923 when he became senior superintendent engineer in charge of maintenance and operation of all transmitting stations and studio centres, but he was earlier employed by the Marconi Wireless Telegraph Co. Ltd., first at Chelmsford and later at Marconi House running 2LO, the London broadcasting station. With the B.B.C. he became assistant chief engineer in 1929, and succeeded Sir Noel Ashbridge as chief engineer in 1943.

Turning to the Sections, **Mr. John F. Coales,** O.B.E., M.A., M.I.E.E., F.Inst.P., the chairman of the Measurement Section, was at one time more interested in radar, and in fact, from 1940 to 1946 he was responsible for the development of all Naval fire control radar, for which services he was awarded the O.B.E. He then became director of research to Elliott Brothers (London) Ltd., and built up their Borehamwood Research Laboratories which became well known for their original work in electronic, micro-wave and computing machine techniques. Being exceedingly interested in higher technological education he resigned from Elliott's in October, 1952, to take up an appointment in the Engineering Department of Cambridge University to organise research and post-graduate training in servo-mechanisms and control systems.

The chairman of the Radio Section, **Mr. J. A. Smale,** A.F.C., B.Sc., M.I.E.E., can claim an even longer association with wireless than Mr. Bishop, although his early concern was with wireless telegraphy during the first world war. He was with Marconi's Wireless Telegraph Co., from 1919 until 1929 when he joined Cable and Wireless, of which he is now engineer-in-chief. He has been responsible for many wireless telegraphy developments, notably the wireless relay stations, and the system of emergency wireless circuits developed before the war, which later became of great value to Allied communications. Incidentally, he is an accomplished pianist and organist.

The Supply Section has a most appropriate chairman for its new session—**Dr. L. G. Brazier,** B.Sc., M.I.E.E., F.Amer.I.E.E., director of research and engineering to British Insulated Callenders' Cables Ltd., for he has been closely associated with developments for the Supply Industry since around 1925 when he joined Callender's to work on the gas pressure cable, and other high voltage transmission research. Since that time he has been responsible for the development of the B.I.C.C. Research Laboratories at Wood Lane, London, and during the 1939-45 war he played an important part in the development of the buoyant cable, also radar development and prototype production.

Mr. J. F. Coales

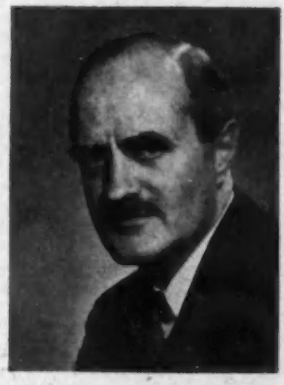


Mr. J. A. Smale

Dr. L. G. Brazier

Mr. B. L. Metcalfe

Chairman of the Utilisation Section is **Mr. B. L. Metcalfe,** B.SC., A.R.T.C., M.I.E.E., M.I.Mech.E., who holds the important post of chief mechanical and electrical engineer in the Production Department of the National Coal Board at the London headquarters. Prior to December 1948 he was technical director of the Brush Electrical Engineering Co. Ltd., and throughout his career he has been associated with mining engineering. He began with Metropolitan-Vickers Electrical Co., where he became chief of the mining section of the general engineering department, and from 1940 to 1945 was chief electrical engineer to Powell Duffryn Ltd.



President for the session, Mr. H. Bishop

For their chairman the North Midland Centre has chosen a very active business man —**Mr. George Caton,** M.I.E.E., managing director of Yorkshire Switchgear and Engineering Co., and director and founder of Electro-Mechanical Manufacturing Co. Ltd. Patentee of the range of IVIO metal clad switchgear, he has been responsible for considerable developments since joining his present organisation in 1939. Prior to that he was chief engineer of the Switchgear Department of Brush Electrical Engineering Co. and until 1936 held a similar position with the Harland Engineering Co. Ltd., Alloa. His initial training was with Whipp and Bourne. He has made many business trips abroad.

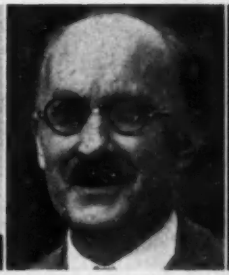
Chairman of the Merseyside and North Wales Section, is **Mr. T. Coates,** M.Eng., M.I.E.E., M.I.Mech.E., manager of No. 3 sub-area, and sub-area liaison officer to the Merseyside and North Wales Electricity Board. Apart from an apprenticeship with Metropolitan-Vickers and war service in the Royal Navy (Air Branch)—when he commanded an air squadron for two years—he served with the Liverpool Corporation Electricity Department until vesting day. Initially he was technical engineer, but later he became chief technical assistant, and, after being recalled to Liverpool in 1943 to resume his work there, was appointed deputy city electrical engineer in April 1945.

Actively associated with electricity supply in Scotland since 1922, **Mr. Charles H. A. Collyns,** M.I.E.E., is chairman of the I.E.E. Scottish Centre. He has been manager of the Fife sub-area of the South East Scotland Electricity Board since vesting day. After War Service, he started with the Musselburgh and District Electric Light and Traction Co. in 1922, but two years later was transferred to the Lothians Electric Power Co., with which he served in various capacities, ultimately being general manager.

For the North Eastern Centre, the chairman is **Mr. H. Esther,** B.Eng., A.M.I.E.E., who is head of the operation and maintenance section in the chief engineer's department of the North Eastern Electricity Board. Educated at Waterloo-with-Seaforth School, and receiving engineering education at Liverpool University, he joined the N.E.S.Co. as a student engineer in 1923. After holding various positions he was appointed engineer, Operations Department (Transmission and Distribution) in 1947. *(To be continued)*

Mr. G. Caton

Mr. T. Coates



Mr. C. H. A. Collyns

Mr. H. Esther

PERSONALITIES

IN THE INDUSTRY

Appointed to succeed **Mr. H. W. Swann** as H.M. Senior Electrical Inspector of Factories, as from October 1, is **Mr. F. H. Mann,** M.I.E.E., who for the past eleven years has been deputy senior electrical inspector. Mr. Mann is also taking over Mr. Swann's advisory work in connection with the Home Office Inter-departmental Committee on Safety in the Home and his advisory work in the H.O. Fire Inspectorate. He will not, however, carry on the work Mr. Swann has done in the past for the Ministry of Health because that body has appointed specialist electrical engineers. Incidentally, we understand that Mr. Swann is to continue to serve in a personal capacity on the Ministry of Health advisory committee in connection with electricity in operating theatres. Mr. Mann gained early experience with the B.T.H. Co. prior to the 1914-18 war, after service in which he worked in the supply industry before becoming a partner in the firm of Moffett, Rosher and Mann, consulting engineers. In 1931 he was appointed H.M. Electrical Inspector of Factories, being responsible first for the Scotland and later for the Midland areas.

Mr. F. H. Mann

Construction engineer in No. 1 sub-area of the North Western Electricity Board since 1950 **Mr. Sidney Dodd,** A.M.I.E.E., has been appointed, sub-area mains engineer for that sub-area, to succeed **Mr. F. Linley,** now the Board's Purchasing officer. Mr. Dodd started as an apprentice in the Installation Section of the former Manchester Corporation undertaking, and in 1931, became assistant mains engineer (E.H.V. Mains Section). Later he held various posts, ultimately becoming section engineer (transmission), and mains construction engineer.

Following the death recently of Mr. W. J. Terry, chairman and managing director of the London Electric Wire Co. and Smiths, Ltd., **Mr. A. N. Smith** has been elected chairman of the company and **Mr. E. L. Wildy,** A.M.I.C.E., A.M.I.Mech.E., is appointed managing director. In addition, the following four executive officers have been appointed directors of the company: **Mr. F. W. Freeman** (chief accountant); **Mr. G. E. Jewell, Mr. S. B. Klein** (general manager of the Leyton works); and **Mr. G. W. Child** (general manager of the Salford and Trafford Park works).

After only a few months in the U.S.A., **Mr. Arthur Upton,** Assoc.I.E.E., has returned to this country and is resuming his position as manager of the Switchgear Department of Johnson and Phillips Ltd., as from October 1 next. It may be recalled that in March last, Mr. Upton resigned his post with J. and P. to go to America, it was stated, to take up an appointment as general manager of the Switchgear Division of a prominent American company. His return will be welcomed by his many friends in the industry in which he has gained wide experience. Before going to J. and P. he was with Ferguson Pailin Ltd., and Switchgear and Cowans Ltd. He has also served on E.R.A. and B.E.A.M.A. technical committees.

With the increased volume of business the activities of Vickers-Armstrongs Ltd., has been split into three Divisions—aircraft, engineering and shipbuilding, **Mr. P. H. Muirhead,** C.B.E., has already been appointed managing director of the Engineering Division, but on December 1 next, the following changes will be made in that Division: (*a*) **Mr. W. D. Opher,** M.I.Mech.E., to be general manager of the Elswick, Scotswood, Wakefield and Chertsey Works, and (*b*) **Mr. J. R. Kelly** to be general manager of Crayford and Dartford Works and in charge of the Whitehead Torpedo Works in place of Mr. W. D. Opher.

Sir John Green has joined the board of Mitchell Engineering, Ltd.

We are glad to hear that **Mr. G. B. Morrison,** London representative of Universal Boilers and Engineering Co., Ltd., has made a complete recovery from his illness and is resuming duty as from October 1 next. His home address continues to be: 36 St. James Mansions, West End Lane, London, N.W.6.

The position of senior assistant engineer—operation—in the No. 3 (Sheffield) sub-area of the Yorkshire Electricity Board has been filled by the appointment of **Mr. G. L. Mason,** A.M.I.E.E., who is at present second assistant engineer on the Board's system control room at Thornhill. Educated at Heriot Watt College, Edinburgh, he gained experience with the Lothians Electric Power Co., the Electricity Board for Northern Ireland and the Yorkshire Electric Power Company Ltd.

Mr. G. L. Mason

Acting city electrical engineer and general manager at Belfast for the past year, **Mr. R. P. Watson,** B.A., B.A.I., M.I.E.E., has been recommended to be appointed as city electrical engineer and general manager. The matter will come before the city council next Thursday.

Mains supervisor at Great Yarmouth, Eastern Electricity Board, **Mr. E. Willicombe,** A.M.I.E.E., was recently presented with an easy chair on the occasion of his retirement. He joined the staff of the Gt. Yarmouth Corporation undertaking in 1925 as deputy mains engineer.

Formerly of the English Electric Co., Ltd., **Mr. B. Kellett** is joining the sales force of Radio Heaters, Ltd., where he will act as a specialist induction heating sales engineer. He will be based at the firm's London offices. Mr. Kellett has had a considerable experience in the induction heating field, having been with Philips Electrical, Ltd., for many years before the war.

Mr. B. Kellett

Mr. G. M. Cohen has resigned from the Board of George Cohen, Sons and Co., after 50 years' service with the company, owing to ill-health.

Mr. John Elliot, chairman of the Railway Executive since January, 1951, will succeed **Lord Latham** as chairman on the London Transport Executive from October 1. Mr. Elliot was previously acting general manager of the former Southern Railway and was then responsible for the largest suburban and inter-urban electric railway network in the world. His chairmanship of the Railway Executive will terminate at the end of this month when that body is abolished. Other appointments announced are of **Mr. J. C. L. Train** and **Sir Reginald Wilson,** as full-time members of the British Transport Commission, and **Sir Harry Methven** as a part-time member.

Capt. P. V. Jones has been appointed marine sales manager of Cimex-Fraser Tuson, Ltd., and will be primarily concerned with the sale of the company's mechanical deck scrubbing and cleaning equipment to the Merchant Navy. Capt. Jones has had a lengthy service at sea, with various shipping lines, having obtained his master's certificate in 1924. Subsequently he became a dock superintendent during which time he also served as Lt.-Cdr. R.N.V.R. district officer for five Sea Cadet units in Kent.

Capt. P. V. Jones

Mr. K. P. Wood, M.A. (cantab.), who resigned from the board of James Beresford and Son, Ltd., in July has now started his own business at 71 Temple Row, Birmingham 2, we learn. His activities include representation in the Midlands of Edward Holme and Co. (1931), Ltd., and the K.S.B. Manufacturing Co., Ltd.

At the annual convention of the Instrument Society of America which is being held at Chicago this week, **Mr. W. T. Marchment,** controls manager of Evershed and Vignoles Ltd., is delivering an address on electronic process control in oil refineries.

The end of this month will bring the retirement of **Mr. H. H. Hobbs,** A.M.I.E.E., generation engineer (operation) to the Yorkshire Division of the B.E.A. Mr. Hobbs' association with the Supply Industry dates back to 1908, when he joined the North Eastern Electric Supply Co., and after a spell with the Stalybridge undertaking, became senior charge engineer to the Charing Cross, West End and City Electric Supply Co. in 1913. In 1920 he returned to the North Eastern Co. as charge engineer at North Tees power station, but the following year was appointed resident engineer at the company's Thornhill power station, then under construction. With the completion of that task, he became resident engineer and deputy generation superintendent at the new Ferrybridge power station in 1927, and was promoted to generation superintendent there in 1946.

Mr. H. H. Hobbs

Mr. A. E. J. Walker, Birmingham branch manager of Siemens Electric Lamps & Supplies Ltd., has been appointed sales manager of British Electric Lamps Ltd.

Leaving today for a six weeks' air tour to pay a further visit to the Caribbean and Central American countries is **Mr. A. H. G. Hall,** regional manager, Central American Division, to Hoover Ltd. He will be accompanied by **Miss Ruth Mercer,** one of the company's overseas washing consultants. The countries to be visited are Bermuda, Jamaica, Trinidad, Panama, Costa Rica, El Salvador, Guatemala, Mexico and the Bahamas. The tour is being undertaken to maintain contact with Hoover distributors in the countries concerned and to discuss plans for the future.

OBITUARY

Mr. D. P. Gilbert, A.M.I.F.E., formerly assistant staff engineer to the G.P.O., died on September 15.

Dr. Colin G. Fink, who died in New Jersey on September 16, aged 71, claimed to be the originator of the drawn tungsten filament for electric lamps. A professor emeritus of chemical engineer-

ing at Columbia University, and head of its division of electro-chemistry from 1922 to 1950, he developed chromium plating of metal and a process of electro-plating metal with tungsten. He also originated a platinum substitute for radio tubes as well as tungsten lamps, an insoluble anode for copper and a process for smelting and refining tin.

Mr. H. J. Hodges, formerly chief labour officer to W. T. Henley's Telegraph Works Co. Ltd. from which position he retired at the end of 1949 but has since served in a consultative capacity, died on September 10. He started with Henley's at their Woolwich works in 1897, where he attained the position of assistant works manager in 1939. He became chief labour officer to the company in 1943. From 1937, he served on the National Joint Industrial Council for the Cable Making Industry and was for six years chairman on the employers' side.

Mr. J. T. Warburton, of the British Thomson-Houston Co., Ltd., died at Liverpool on September 17, aged 68. He had been connected with the shipping industry for many years, and since joining B.T.H. in 1931 had looked after the supply of lamps and all lighting equipment to the Admiralty and Mercantile Marine.

Mr. Percy Buckler, B.SC., M.I.E.E., director and joint general manager of Bruce Peebles & Co. Ltd., died on September 21.

Time Switch Cooking Is Here

English Electric's remarkable "Automatic" cooker

A MARKED advance in cooker design and control only possible with electricity is evident in the Model 2011, latest "Automatic" cooker introduced by the English Electric Co. Ltd.

Main feature of the new model is the auto-control panel which is plugged into brackets mounted on the backplate of the cooker in place of the normal splash plate. This panel carries only two controls—an automatic time switch controlling supply to the oven, permitting automatic switching in and out at pre-set times, and a four-hour clockwork "Ringer."

The Timer is set for automatic cooking by three switches, the centre knob is the master switch by which the oven is changed from normal oven switch control to automatic control. Over this is a red knob, setting cooking period, and below a black knob setting time for switching out the oven elements.

The "Ringer" is of the type available for giving warning of time expiry but is now built into the control panel. On the left of the control panel is a neon pilot-light controlled by the Simmerstats, which gives a clear indication that the hotplates are in use. To the left of this on the side of the panel is a 13 amp shuttered socket also built into the panel, making a neat outlet point for kettle, food-mixer, iron, etc.

Mounted over the hotplate is a lighting fitting on two graceful supports. This takes a 6 W fluorescent lamp in styled shade so placed to give a clear view of what is cooking.

General specification of the new model embodies the fine features evident in the other E.E. models, particularly the 2009D. The frame is cast iron; panels are steel. Three plates are fitted on the cast iron hob. They are an 8 in. diameter 1800 W plate, a 6½ in. diameter 1,000 W plate, and a grill boiler 10½ in. × 8 in., 2,500 W loading. There is Simmerstat control throughout, but radiant plates are available at extra cost.

The model is finished in Dove Grey and White, and will retail at £55 with the usual hire-purchase terms available. A full colour illustrated 400 recipe cookery book is provided with each cooker.

ALUMINIUM CABLE DATA

ALUMINIUM cables have been in use for a few years only, and many engineers must still be somewhat uncertain as to their properties and advantages. This ensures a special welcome for a publication "Aluminium Power Cables," which has been produced by the Cables Division of the Telegraph Construction and Maintenance Co. Ltd., Telcon Works, Greenwich, S.E.10.

The cables described are those having both sheath and conductor fabricated from aluminium. Density and conductivity considerations combine to give a conductor half the weight of the copper design of the same current carrying capacity, while the sheath can be thinner as well as lighter than the lead or lead-alloy equivalent.

Besides giving such information in more precise form, the booklet has some interesting comments to make on the resistance of aluminium cable to corrosion. After all the possibilities have been discussed, it is concluded that the danger of corrosion with aluminium is of no greater consequence than with lead.

Sootblower has non-reversing motor

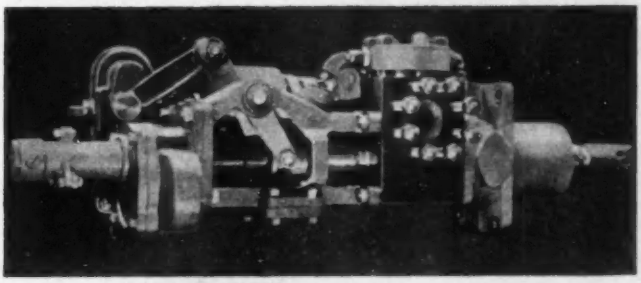
THERE is no need for reversal of the operating motor in the new "Unidirectional" retractable sootblower introduced by Babcock & Wilcox. This important advantage means that a continuously running motor can be employed, with simple "on-off" control only, there being no need for reversing contactors or overlap timing. The simplified control system has been designed by B.T.H.

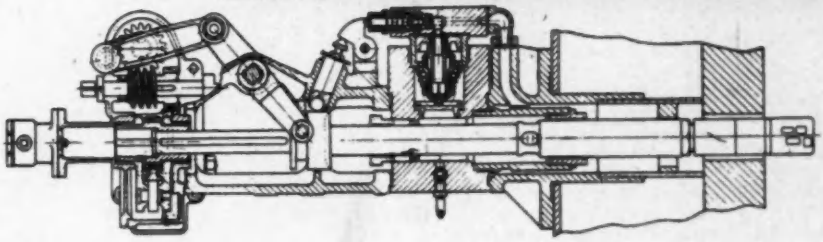
Driving Motor

The driving motor for each sootblower has integral speed-reduction gearing, and drives a short horizontal shaft. This shaft carries a worm and a pinion, which drive two independent mechanisms. The worm wheel carries a crank which, through a suitable linkage, advances or retracts the nozzle. From the pinion a rack wheel is driven, this wheel carrying a pin which transmits the drive to a rack. The resultant motion turns the nozzle backwards and forwards through a distance which can be adjusted between 80° and 210° of arc in 10° steps. The nozzle twice covers its arc on the way into the furnace, while in, and on the way out.

Because for each normal sootblowing operation the motor is only required to run for about two minutes, no over-current protection is considered necessary—except, of course, for the provision of h.r.c. fuses. An electrically operated timer is provided, however, so that if any individual blower fails to complete its operating cycle within a pre-set time interval, the motor is disconnected.

A general view of the blower with, at the bottom of the page, a sectional drawing





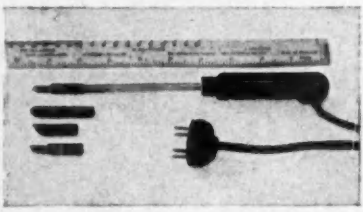
E

The BUYER'S *Column*

Elremco's New Soldering Iron

DESIGNED primarily for use with the company's bus-bar installation (see *Electrical Times*, p. 78, 9 July, 1953) but naturally for use other than with the system is a new soldering iron introduced by the ELECTRICAL REMOTE CONTROL CO., LTD., East Industrial Estate, Harlow New Town, Essex.

This industrial soldering iron type LV20 is equipped with four interchangeable bits between 5/32 in. and 5/16 in. which fit completely over the 35 W heating element partly contained in the stock of the iron. The diameter of the iron, not including the moulded handle, does not exceed 5/16 in., a useful factor when working on electronic and radio apparatus where miniaturised. Length is 9½ ins. and weight only 2½ ozs. Heating time is 35-50 seconds only, depending on the size of the copper bit.



Miniature iron with changeable bits

Price of the LV20 soldering iron is 16s. 9d. whilst replacement copper bits cost 11d. and replacement elements 1s. 11d.

Price of the List 100 bus bar sections of the installation in 6 ft. lengths is 12s. 6d. per foot; 2-pin soldering iron plugs, 1s. 6d. each; and the approximate price of the mains transformer unit 180-230V input and 20V output (standard, but other voltages as specified) is £26 per kVA.

B.T.D. Welding Generators

SIX new diesel driven arc welding plants have been marketed by BRITISH TWIN DISC AND CLARIFIERS LTD., Aldwych House, W.C.2.

They have in common extreme simplicity of design and comprise Lister "Freedom" diesel engines direct coupled to cumulatively compound wound d.c. generators made by Lancashire Dynamo and Crypto Ltd.

An important feature of the engine design is a centrifugal governor which provides close speed control and maintains settled variation within 2%. A fully automatic engine release limits overloading to 10%. In each case the engine has a heavy flywheel to control cyclic irregularity.

The drip proof generators are self-exciting whilst dual control of the output is provided by a separate voltage and fine current control operated independently of the main "click" action current selector.

Connection from the generator windings are taken direct to the current selector switch on all the higher current ranges there being no series resistances in the circuit. Continuous strip field resistances, however, cooled by circulating air from the generator fan are provided for controlling the lower current ranges.

Final feature of design is the heavy fabricated baseplate in which the units are mounted and enclosed by a pressed steel housing. Generator output of the six models ranges from 300-600 amps intermittent h.p. varying from 16 h.p. to 48 h.p.

Isopad's "Lana" for the Winter

LATEST production of ISOPAD LTD., 30-32 Rosemont Road, N.W.3, is the "Lana" pure wool electric blanket.

Measuring 60 in. by 80 in. full size of an ordinary blanket the "Lana" can be tucked in all round the bed. The heating portion of the blanket measures 54 in. by 30 in. and thus lies in the correct position on the bed.

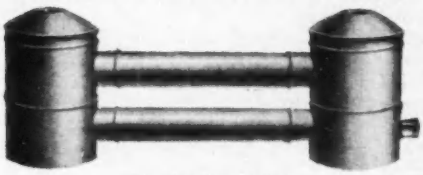
Isopad Ltd. put forward a point of economy saying that no other bed cover is necessary when using a "Lana" blanket. Three-heat control (180, 90 and 45 W) with two off positions are incorporated in the switch which has figures in relief so that the switch can be operated in the dark. Thermostatically controlled and fitted with TV interference suppressor the "Lana" blanket is available in three colours, coral pink,

sky blue and sage green. The blanket is provided with 2 ft 6 in. flexible cable to control switch and 8 ft 6 in. from switch to two pin plug and retails at £10 9s. (inc. £1 13s. tax). For 110/125 and 200/250 V supplies.

"Remploy" Greenhouse Heater

DUSTPROOF and requiring little maintenance are two patterns of automatic, water filled, electric greenhouse heaters which are made and marketed by REMPLOY LTD., 25 Buckingham Gate, London, S.W.1.

The standard model is loaded at 750 W at 230/250 V and is 6 ft 8 in. long and 14 in. deep at the base. It has two parallel circulation tubes through which the heat emanates to circulate



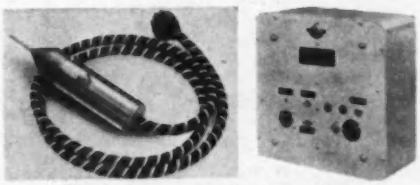
The Popular Model

through the house. The temperature is regulated by a Kieft air thermostat and is maintained at any desired temperature between 35° and 75°F. Constructed of aluminium tubing and castings the standard model is fitted with an immersion heater equipped with automatic cut-out in event of the heater running dry. It is priced £8 5s. and the thermostat £2 2s. 6d.

The "Popular" model is smaller in dimensions —3 ft 2 in. long by 8 in. depth at base and is generally similar to the standard model but is made of sheet steel galvanised after construction. Loading of this model is 850 W at 230/250 V. The "Popular" model is priced £4 9s.

E.M.I. Probe and Delay Amplifier

ALTHOUGH designed especially for use with the E.M.I. Waveform Monitor Type 3794 the new Probe & Delay Amplifier Type 2 introduced by E.M.I. FACTORIES LTD., Hayes, Middlesex, is suitable also for use with other high speed oscilloscopes.



The probe unit and delay amplifier

The unit offers an ideal solution to the problems encountered in viewing or measuring the leading edge component of a short duration waveform or transient.

A jitter free signal presentation on the cathode ray tube can be obtained under the most adverse conditions due to the direct trigger and signal delay facility of this unit.

A range of interchangeable plug-in attenuator heads is supplied for use with the probe unit, which is connected to the delay amplifier by a cable of 5 ft 6 in. in length.

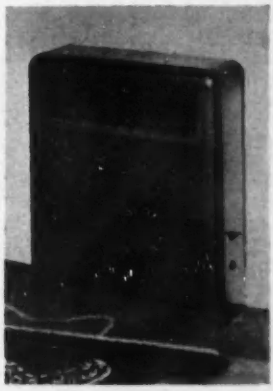
The Kaloric "Mayfair" Heater

AN elegant heater which has been marketed by M. & J. Lossos & Co. LTD., 31 Beethoven Street, London, W.10, in time for the cooler weather is the "Kaloric-Mayfair" convector heater which we have illustrated.

This is a restyled version of the company's "Standard" convector heater more suitable for domestic use. It is being manufactured in loadings of ¼, 1, 2 and 3 kW in bronze cellulose or cream stove enamel and with thermostat if desired.

Prices as follows:

	£ s. d.
750 W and 1 kW:—	
Bronze	9 15 2
Cream	10 16 9
do. with thermostat:—	
Bronze	11 6 2
Cream	12 7 9
2 kW:—	
Bronze	15 17 4
Cream	17 7 4
do. with thermostat:—	
Bronze	17 8 4
Cream	18 18 4
3 kW:—	
Bronze	19 10 2
Cream	21 0 2
do. with thermostat:—	
Bronze	21 1 2
Cream	22 11 2



The "Teleloud" Intercom. Unit

AN inter-office and works communication system involving the use of microphone and loudspeaker has been marketed by WINSTON ELECTRONICS LTD., Hampton Hill, Middlesex.

Known as the "Teleloud," the system operates from normal a.c. mains supply with a range of 100 ft between desk unit and amplifier.

Physically compact and robust the "Teleloud" equipment can be arranged for fitting into desk units or into the desk itself. Selective calling is by lever switching, whilst a full dialling system is incorporated. A hand set is provided for private conversation as required.

It is understood that good sound reproduction with speech clipping is a factor of the unit and "break in" in switching is automatic and instantaneous.

Automatic Staircase Switch

MARKETED in this country by GRESHAM ELECTRICAL CO. LTD., 17 Percy Street, London, W.1, is a new automatic delayed action staircase relay for remote push button control of Continental origin.

The period of light is controlled by means of a bi-metal strip making a simple mechanism

which is said to be reliable, not requiring much maintenance. An adjusting screw is provided to set the required duration of light which can be varied from 1 minute to 4 minutes. When in use the solenoid coil is isolated and cannot overheat or burn out through a push-button failing to open the circuit.

The unit has a switch lever at one side for changing from time switching to permanent lighting as desired. For 110 or 220V a.c. and d.c. supplies the unit can handle a maximum current of 3 amperes.

New "Kabi" Storage Bin

A NEW addition to the range of bench assembly and storage trays produced by PRECISION COMPONENTS (BARNET) LTD., 13 Byng Road, Barnet, Herts., is the S.B.100 Storage Bin.

Produced in black, cream, red and green as well as in the standard brown phenolic plastic material, the bin measures 7 11/16 in. long, 5¼ in. wide, and 3⅛ in. deep. Price is 5s. 3d. each nett. Colours other than brown being available in quantities of one gross or over.

Purchase Tax on Conservators

WE are asked to make it clear that not all frozen food conservators of 12 cu. ft and below are subject to purchase tax as inadvertently stated in our issue of August 6th. Purchase tax is applied only to those conservators in which the door or doors and lids are hinged to the body of the cabinet and not those which are fitted with "plug-type" or "flip-flap" lids in the top surface of the cabinet.

TRADE PUBLICATIONS

LIGHTING.—Linolite Ltd., 118 Baker Street, London, W.1, have issued a leaflet D.15 showing their range of fittings for showcase shop window and architectural lighting together with details of their other decorative ranges.

PLASTICS.—New publication "Telcon Plastics their end uses and characteristics" has been issued by the Telegraph Construction and Maintenance Co., Ltd., Telcon Works, Greenwich, London, S.E.10.

FLAMEPROOF EQUIPMENT.—Two new publications by Simplex Electric Ltd., Broadwell, Oldbury, Birmingham, are No. FL. 1998, a flameproof equipment price list as at Sept. 7th, 1953, and an attendant FL. 1999 flameproof equipment information sheet.

NEW AND SECOND-HAND PLANT AND EQUIPMENT.—First post-war issue of the "600" group machinery catalogue has just been published by George Cohen, Sons and Co., Ltd., Cunard Works, Chase Road, N.W.10.

CONTROL GEAR.—A leaflet, F.M.14, describing their voltage regulating equipment has been issued by Foster Transformers Ltd., South Wimbledon, S.W.19.

MOTORS.—Two lists recently issued by Lancashire Dynamo and Crypto, Ltd., Trafford Park, Manchester 17, are A1 Stock and Price List of A.C. Motors and W.700 Illustrated descriptive list of standard A.C. Motors.

FIRES AND APPLIANCES.—A leaflet is available from Premier Electric Heaters Ltd., Keeley St., Birmingham 9, featuring the firm's range of safe and efficient electric fires.

LIGHTING.—New leaflet issued by British Central Electrical Co., Ltd., 6 and 8 Roseberry Avenue, London, E.C.1, sets out in a very clear manner the principal features of the Standard "Gripper" headlamp.

PLASTICS.—Some idea of the extensive plastics work undertaken by the General Electric Co., Ltd., Magnet House, Kingsway, W.C.2, is to be gained from perusal of a new brochure, 2059, "Moulded Plastics for Industry," just published by the company.

STREET LIGHTING.—New illustrated brochure on this subject issued by the General Electric Co., Ltd., Magnet House, Kingsway, W.C.2, shows examples of all types of public lighting installations issued by the firm.

COMMUNICATIONS.—Playing on the symbol "η" (Greek letter eta) engineering symbol for efficiency, Communication Systems Ltd., Strowger House, 8 Arnold Street, London, W.C.2, have issued a leaflet recommending internal communications systems as an aid to efficiency in a works or large office organisation.

ELECTRONICS.—The 74700-A Maximum Amplitude Measuring Set is described in great detail in a new booklet issued by Standard Telephones and Cables Ltd., Transmission Division, North Woolwich, E.16.

RADIO AND S.R.E.—The main feature of the 4033-A Cardioid Microphone are set out in a brochure issued by Standard Telephones and Cables Ltd., Public Address Department, Connaught House, Aldwych, W.C.2.

LIGHTING.—"The Eyes Have It" is the clever title of a pamphlet on good lighting issued by The Benjamin Electric Ltd., Brantwood Road, Tottenham, London, N.17.

MOTORS.—"Electric Motors and Food Production" is a booklet showing how Brook Motors are extensively used in the catering and allied industries. Copies are available from the company's offices at Empress Works, Huddersfield, and branches.

BOILERS AND ENGINEERING.—Equipment and Installations for steam generation, petroleum, refining, chemical processes, industrial plant, which has been constructed by Foster Wheeler Ltd., 3 Ixworth Place, South Kensington, London, S.W.3.

FUEL EFFICIENCY.—Seizing on an opportunity to a topical sales tie-up the Cambridge Instrument Co., Ltd., 13 Grosvenor Place, London, S.W.1, have followed publication of the Government Report on Fuel Conservation by the issue of a leaflet, "The Burning Question," which gives details about the service and control equipment which the company can provide.

NEW LITERATURE

The Induction Motor

by H. Vickers, Ph.D., M.Eng., M.I.E.E.

THIS is the second edition of a long-established text book, one of the most comprehensive volumes on the subject in existence. It splits effectively into three parts—essential theory; modifications of i.m.s. and their applications; and design examples—of which the first is likely to be the most generally useful. After an interesting historical introduction, there is a general review of the polyphase induction motor in theory, of the type found in many text-books. The analysis of the squirrel cage rotor is then treated at some length, as is the detailed construction and use of the circle diagram.

Chapters on the single-phase i.m. discuss in turn the cross-field theory and the two revolving fields theory. Braking and speed control are considered at some length in principle, and then commutator motors, phase advancers and synchronous induction motors are dealt with. The remainder of the book—nearly half of it—deals in some detail with design techniques, and a number of examples are given.

As would be expected, the book contains a large amount of mathematics, but this is kept at a level well within the reach of the professional engineering student, who should derive much value from the book if he is particularly interested in machines. Published by Pitman, 531 pages, 9 in. by 6 in. Second edition, price 70s.

Additions to the MK range

CONCURRENT with the publication of their new electrical accessories catalogue MK Electric Ltd., of Edmonton, will, in a few weeks' time, be introducing several new additions to their range of accessories which we have summarised as under:

Switched Fused-Spur Boxes

Surface pattern List No. 953. Flush pattern List No. 949. These accessories are similar to the unswitched designs introduced some time ago, but they also incorporate a single-pole 13-ampere switch to conform with the requirements of IEE Regulation 701. A 13-ampere cartridge fuse-link is housed within the removable carrier.

The list price of both units is 108s. dozen Brown, 120s. dozen Ivory.

A.C. Pilot Lamp Switchsockets

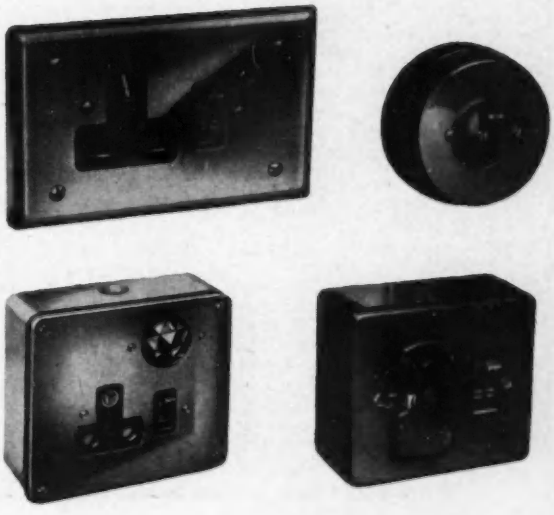
This range has been redesigned with solid brass frontplates having radial edges and with no sharp corners. Surface and Flush patterns are available with either 5- or 15-ampere shuttered outlets and s-p or d-p switching. Standard finish is BMA, but flush units can be supplied with plates in chrome. The pattern illustrated is a 15-ampere unit, Surface type, List No. 2432/515, 28s. each complete with fingergrip plug, whilst Flush type, List No. 2346/515, is available at 22s. each complete with fingergrip plug.

13-ampere Switchsockets

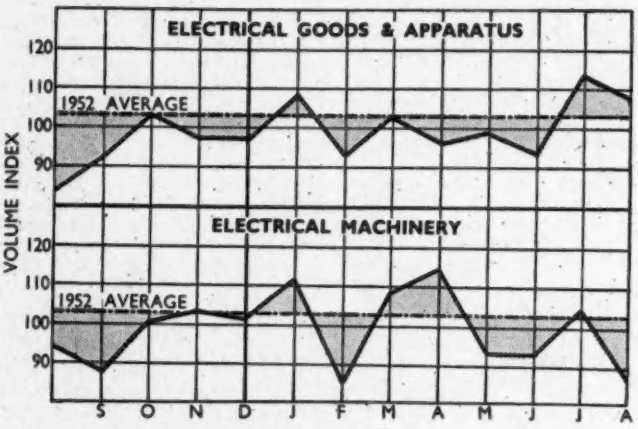
New introductions to the 13-ampere socket range consist of Surface and Flush metal-clad patterns in horizontal boxes, and with single-pole or double-pole switches. The Surface patterns have protected dollies. List No. 2575/646, 17s. 4d. each complete with fused-plug. Also available with a brass plate finished BMA. Flush pattern has a brass front plate finished either BMA or chrome and can be supplied with s-p or d-p switching. The pattern illustrated is List No. 2978/646 priced at 16s. 6d. each list.

5-ampere Slot Switches

These are similar to the existing range but have 2¼ in. bases instead of 2 in. The one-way surface switch illustrated is List No. 4024 priced at 23s. 8d. dozen list.



EXPORTS AND IMPORTS



EXPORTS VOLUME INDEX

Exports of electrical goods and machinery last month failed to maintain the July level, to which, no doubt, the incidence of the peak summer holiday period played its part. On the other hand, exports of electrical goods and machinery were substantially higher than for August 1952, as shown by the Electrical Times Volume index for this class which was 108, against 83·5, both based on 1950 as 100. For electrical machinery a greater fall is recorded, the index being 87 compared with 105 for July and 94 for August last year, the basis being 1950 as 100. In value, exports of electrical goods and apparatus amounted to £8,896,690 and of electrical machinery £4,485,088.

EXPORTS of all electrical goods during August showed an unwelcome decrease again, in line with the trend of all goods last month. The reduction compared with the previous month's figures was largely accounted for by the effect of industrial holidays and by the shorter month, August having 25 working days against 27 in July. The reduction affected nearly all the electrical items, the principal exception being primary batteries.

Apart from the information in our table the monthly Board of Trade returns show that complete electrically operated washing machines of not more than 150 lb. in weight were exported to a total value of £149,903 last month, along with £70,498 worth of larger models.

Description	Exports Value Month of August			Imports Value Month of August		
	1951 £	1952 £	1953 £	1951 £	1952 £	1953 £
Telegraph and Telephone Wires and Cables—						
Submarine	106,330	14,489	21,532	—	—	—
Other	561,219	453,388	428,881	—	—	—
Rubber Insulated	580,241	466,755	291,488	—	—	—
Insulated, other than Rubber	1,030,600	1,075,202	982,791	—	—	—
Wireless Apparatus, including Valves	2,131,525	1,934,098	1,921,786	280,773	307,996	416,860
Telephone and Telegraph Apparatus	1,329,106	1,215,508	1,367,364	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Filament Lamp Bulbs	147,272	73,099	68,056	13,269	6,010	17,587
Other Descriptions	430,088	395,219	352,250	59,077	43,238	45,413
Batteries (primary)	185 589	155,680	206,242	—	—	—
Accumulators, Portable	351,031	303,450	186,857	—	—	—
„ Stationary	141,493	32,465	46,634	—	—	—
„ Parts and Accessories	67,143	27,836	36,176	—	—	—
Electrical Cooking and Heating Appliances	455,508	238,801	242,330	—	—	—
Ammeters, Voltmeters, etc., and Parts	160,485	108,259	136,186	42,915	49,401	84,085
House Service Meters	94,966	96,784	66,753			
All Other Instruments	106,007	108,784	134,356			
Electro-Medical Apparatus	36,528	31,922	39,688	—	—	—
X-Ray Apparatus, etc.	153,616	84,045	107,084	60,166	18,182	23,537
Insulating Materials	213,137	108,501	84,833	—	—	—
All Other Articles	614,806	371,959	557,808	125,230	83,485	87,588
Total of Group	8,896,690	7,496,344	7,279,585	581,430	508,312	675,070
Electrical Machinery:—						
Generating Sets, Diesel (not exceeding 200 kW)	514,260	296,177	275,458	54,057	46,627	30,779
„ „ „ (exceeding 200 kW)	126,432	122,910	180,199			
Other Generating Sets	137,512	174,089	249,729			
Generators minus Prime Movers and Parts	792,915	798,697	850,230	—	—	—
Motors	883,205	698,531	642,369	35,165	28,835	31,428
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	2,532,833	3,038,689	2,399,245	22,943	40,953	56,890
Fans, Electrically and Power Driven	196,601	183,303	202,623	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	450,810	203,622	248,529	—	—	—
Total Appliances and Machinery	14,531,258	13,012,364	12,327,967	684,595	624,727	794,167

The WEEK in NEWS

New Productivity Committees

Progress in Birmingham and Scotland

INFORMATION concerning the progress of the British Productivity Council reached us last week. Since this body took over from its predecessor, the Anglo-American Council on Productivity, some 60 local committees have been set up in all parts of England and Scotland. Although emulating the work of its predecessor, the new Council is not so concerned with the production of theoretical advice, but rather with fostering an incentive to greater production, which it affirms must first come from industry itself, and then offering its assistance. Instead of the issue of pamphlets on how industry should be reorganised, is the endeavour to inculcate a spirit of co-operation and mutual interest.

One of the latest bodies set up under the auspices of the Council was the Birmingham Productivity Association, which held its first meeting last week. The Association already has extensive plans. In the first place, an exhibition is to be held depicting the methods employed to gain higher productivity in many of the city's factories. The exhibition will probably take place next spring. They are to encourage individual industries to form their own productivity committees and offer help whenever asked. Another task of the Association is the organisation of inter-works visits.

The Council's plans in Scotland are also progressing well. Three committees have so far been established, in Glasgow, Edinburgh and Aberdeen. We understand that the Glasgow body was the first to be formed. In addition to these, inaugural meetings are to be held at Kilmarnock, Kirkcaldy and Dumfries this month.

Attempts are also being made to form local committees in Dundee, Falkirk and Paisley. Many towns not originally scheduled as centres for the formation of committees have asked that they be established in their areas.

Radio Sales still Rising in July

MAIN feature of the analysis of sales of radio and television sets during July, just issued by the R.T.R.A. was the increase in sales of radios. In 1952 there was also a rise in sales during the same month but this latest increase is more remarkable in that it was considerably greater and followed closely the boost caused by the Coronation. A more logical trend was shown in the sales of television sets which fell by 1.76 to 5.96. July 1952 figure was 3.93. Actual figures concerning radios were 7.23 in July compared with 5.86 in June and 5.3 in the corresponding month last year.

TAX VALUATION RULE RELAXED

A RELAXATION in purchase tax in respect of extra delivery charges comes into force on October 1. The modification gives effect to a Grant Committee recommendation. Tax is chargeable on the wholesale value of the goods inclusive of the cost of delivery and in general this ruling continues, but where an extra charge for delivery over and above the normal free-delivered price is made on small orders, or in special circumstances, that extra charge may be ignored in assessing the tax wholesale value. The relaxation is subject to certain conditions.

Marine Exhibition a Great Success

REPORTS following the 19th Engineering, Marine and Welding Exhibition, which closed last week, express complete satisfaction on the part of both exhibitors and visitors. The exhibition attracted about 50% more visitors than that previously held two years ago. It is known that prospective customers from at least 60 overseas countries attended.

The First Half-Century

It is now two years since Herr O. Lasche read his paper on "High Speed Railways" before the Engineering Conference at Glasgow, and described in full detail the cars and equipment designed by the Allgemeine Electricitats Gesellschaft for three-phase running at 120 m.p.h. and upwards. At that time no car had been run on rails, only on an experimental platform. When first it was tried at Zossen a speed of 100 m.p.h. sufficed to kick the track to pieces, but the Allgemeine was not to be beaten, and recently a speed of nearly 114 m.p.h. was attained. The general adoption of the system, however, would probably imply the re-laying of the permanent way all over Germany, which is rather a large order.—*From our issue Sept. 24, 1903.*

General view of the wing assembly bay in a large aircraft factory showing fittings supplied by Thorn Electrical Industries Ltd.

SIX HUNDRED FITTINGS IN NEW INSTALLATION

THE wing assembly bay and paint shop at a recently completed factory of one of Britain's largest aircraft manufacturers were the subjects of lighting installations involving nearly six hundred fluorescent lamps and fittings. The assembly bay is 510 ft in length and 180 ft wide and is illuminated now by 398 (FK 2080) fittings housing two 5 ft 80 W tubes each, supplied by Thorn Electrical Industries. The fittings have been suspended from roof trusses on short chains at a height of 19 ft in 12 rows. In the paint shop, which is 196 ft by 120 ft, lighting is provided by a combination of 48 (DD 0301) fittings with 300 W tungsten filament lamps, and the same number of (CO 1501) fittings with h.p.m.v. lamps. This was considered best for the colour matching of paints. All the fittings in the paint shop are recessed in the roof behind protective glass screens. The fluorescent lamps used in the factory were Atlas White double-life tubes. The electrical installation was carried out by the Alliance Electrical Co.

PUBLIC SPEAKING SUBJECTS ANNOUNCED

THE electrical industry's public speakers can now get down to the task of preparing their speeches for next year's E.D.A. Public Speaking Competition. The subjects from which they can make their choice were announced last weekend. They are "The Housewife in the Reign of the Two Elizabeths," "Life Without Electricity," "Bringing Electricity to Rural Areas," and finally "The Place of Electricity in the National Economy." Closing date for the receipt of entries is December 1. Rules for the contest remain unchanged. It is open to all in the supply industry who are under 35; there will be the usual two sections for men and women; there will be the preliminary area competitions to gain places for the finals; and as regards actual speaking, each candidate is allowed 15 minutes.

Canadian Order for Transmission Apparatus

AN £80,000 order for special apparatus to transmit weather charts of the Canadian Railways have been placed with the Beckenham (Kent) firm, Muirhead and Co. Ltd., precision electrical instrument makers. Main value of the distribution of meteorological information and charts by "facsimile" transmission, is the great saving in time—a vital factor if the information is to be of greatest use.

Cross-Channel Cable

EXPERIMENTAL lengths of cable laid across the Channel have been recovered after five weeks of immersion and now await critical examination. The trials are being carried out to discover the practicability of linking the British and French electricity distribution networks. We understand a meeting of the two supply authorities, as well as the cable manufacturers, was to be held yesterday (Wednesday).

Exporting Vacuum Cleaners to Canada

FOLLOWING our report (September 10 issue) concerning the importation of vacuum cleaners into Canada, we have received from Bylock Electric Ltd. some revealing figures of that company's activities in the same market. It will be recalled that the total number of cleaners exported from this country to Canada during 1952 was recorded as 41,100. Bylock have informed us that their exports in the same period amounted to 21,613. The company adds that during the 12 months ending June 30 last, the figure was still larger, namely 27,252.

TURKISH IMPORTS

MORE foreign currency earnings are to be spent on importing goods into Turkey, it has been announced in Istanbul. Turkish authorities have listed the goods which may be imported. Among these are copper cable, vacuum cleaners, and washing machines. A stipulated amount of the currency becoming available will be allowed to be spent on various types of goods.

Operating Theatres

IN our article on "Electricity in Operating Theatres" (September 10 issue), we regret we did not acknowledge the illustration to Technical Lights and Equipment Ltd., London. The photograph showed the firm's type A39S "Scialytic" lamp installed at Queen Victoria Hospital, East Grinstead.

S.W. Board's Billing Office a Show Piece

A SHOW PIECE of mechanical accountancy seems an apt description for the Central Billing Office operated by the S.-Western Electricity Board at Plymouth. This one office is now handling all electricity accounts for consumers in the Board's area, which extends from Bristol to Land's End. This has been brought about in the past five years, for prior to 1948 there were 31 different billing centres sending out as many different types of accounts. These are now of standard design. The office, which has aroused a great deal of interest overseas as well as at home, is the largest single billing unit operated by any of the public utilities in this country. Last Thursday Mr. S. F. Steward, the Board's chairman, visited the office.

At the present time about 2,250,000 bills a year are being handled in the office, where one mechanical handler and its associated equipment deals with about 50,000 accounts in each quarter—work which would occupy a staff of over 25. Much of the work is done by machine. The morning post (averaging 2,000 letters) is handled by one device which automatically opens the letters in about five minutes. Out-going forms are automatically folded by another machine. The bills themselves are dealt with by sorters, reproducers, collators and tabulators.

The working of this large office has also revealed some quite remarkable facts. About 10 per cent of consumers pay their bills at once, while some 25 per cent wait for reminder notices. Every 45th bill sent out is for a consumer who has left his premises. Every day also (strange as it may seem) about three consumers have to be told they have paid their bills twice. Invariably they have paid on a reminder and later discovered and paid their original bill.

Company Fined for Polluting River

A FINE of £31 10s was imposed on the British Thomson-Houston Co., Ltd., at Rugby last week in two cases of river pollution. They were also ordered to pay 35 guineas costs. The Severn River Board alleged that fish life had been destroyed for about 13 miles along the Avon, and Coventry had had to stop taking water for a day or two. The cyanide content three days after the fish were seen to be dying, was stated to be 14 times the safety limit.

For the company it was said that the occurrence was not through neglect. Liquid from a plating vat had as usual been syphoned off and flushed into acid drains. They were now using another method.

FIVE SHORT COURSES

A SERIES of special short courses of lectures have been arranged by S.E. London Technical College's Dept. of Electrical Engineering and Applied Physics. They are on "Bessel Functions" and "M.K.S. System" both of which start on November 24 and last six weeks; "Wide-band Carrier Systems" which opens on November 25 for four weeks; "Variable Speed a.c. Motors" to be held on November 11 and 18; and "Leakage Resistance and Magnetisation Transients" on October 28 and November 4.

[Purchasing Officers' Progress in 1952-53

A REMARKABLE indication of the growth of the Purchasing Officers' Association is given by the chairman in his annual report for 1952-53. Total membership at the end of July stood at 3,260 an increase of 358 on last year. This figure includes 341 registered students, which although very good, nevertheless falls short of the high target set by the chairman at the start of his year of office. Overseas, too, membership of the Association's S. African and Australian branches has risen in the 12 months by about 50%. New branches have been established at Croydon and Hull, in Gloucestershire, Wessex and West Wales. In addition, new groups have been established at Brighton, Derby and in Mid-Kent and Worcestershire. Next year's conference is to be held at Harrogate.

Solid Fuel Convention

THE Use of Solid Fuel in the Home will be the theme of the first post-war convention of the Coal Utilisation Council which is to take place at Harrogate on October 14 and 15. Fuel efficiency experts from five European countries will be among the several hundred delegates expected to attend.

The S.W. Electricity Board's corner at the Trades Fair held recently at Penzance. Demonstrations were given by Miss J. Oddy, of English Electric who provided all the equipment displayed

Load Spreading in Scotland and the South?

ABNORMAL circumstances excepted, the majority of the country should be free of industrial load-spreading this winter. In the main, generating plant should be adequate to meet the increased demand of the coming months but there are some areas where this far more satisfactory position may not apply. These are the Bristol, Birmingham and Glasgow areas. The Southern Regional Board for Industry has recently decided to reconstitute last year's load spreading committee as its services may be required. Last June the Board announced that cuts would not be necessary although economy in peak hours was required. In similar circumstances, Scottish industry is being asked to reduce its electricity demand by at least 10%. This cut will cover peak hours between November 2 and January 29.

British Plant for N.Z. Paper Mills

ELECTRICAL equipment to the value of about £120,000 is to be supplied by Crompton Parkinson Ltd. for the new newsprint and paper pulp making plant of Tasman Pulp and Paper Co. Ltd., at Te Teko in New Zealand. The contract covers the supply of all the 11 kV switchgear comprising mainly 40 oil circuit-breaker units, and nearly 600 a.c. squirrel-cage motors. The former will be for the h.v. distribution system and will control a 20,000 kVA incoming bulk supply from the State Hydro Electric Department; a 12,000 kVA alternator of a turbo set in the power station; outgoing feeders, h.v. motors and transformer sub-stations.

These mills result from an afforestation scheme started less than 40 years ago. This man-made forest, now known as Kaingarod State Forest, is ready to provide about 30 million cu. ft. of wood a year. It is expected that the plant will be in operation in 1955. Consulting engineers are Sandwell and Co. Ltd., Vancouver.

Electric Cooking Favoured

OUR attention has been drawn to an advertisement appearing in a Yorkshire newspaper recently. It read: "Large gas oven 'De-La-Rue' cream vitreous, purchased Feb., cost £64, offers or exchange mod. electric cooker." Simplex Electric Co. Ltd., who pointed out the advertisement to us, said it was heartening to see that even the new de luxe "De-La-Rue" cooker was losing ground against the modern electric cooker.

U.K. Fellowships for Canadian Graduates

RECENT arrivals in the U.K. were 36 Canadian engineering graduates who are here to take up the Athlone Fellowships. The Athlone Fellowship scheme was instituted two years ago and is designed to give Canadian engineers opportunities of learning about British engineering and technical methods. It is administrated by a managing committee under the chairmanship of Sir Arthur Fleming and is representative of the Board of Trade, industry, universities, Ministry of Education, Commonwealth Relations Office, Ministry of Supply and British Council. The B.o.T. provides funds. A British Council course will introduce the students to England.

NEXT YEAR'S CENSUS OF PRODUCTION

INFORMATION to be obtained in the census of production for 1954, which will be taken during 1955, has now been considered. It is to follow the same lines as the last full census which was taken for 1951, and the majority of questions asked will be about the same subjects. Additional information is being sought about wages and salaries to complete details available about labour costs. In the materials section, firms will be asked to state the total cost of materials and fuel purchased with details, by quantity and value, of the principal items bought. Total value of sales and work done, with details of sales of each of a number of products, will also be sought in the output section.

Advertising Britain

A REPORT on the new National Museum of Science and Technology opened in Milan just over two months ago, has been circulated by the Board of Trade and offers an invitation to British manufacturers to gain a little publicity for their goods. It is suggested that U.K. firms could contribute to the Museum's collections thereby advertising British achievements and production in the scientific and technological fields, and indirectly assisting exports. It is understood that German firms are to co-operate.

U.S. Offering 150 Research Fellowships

FUNDS of over $1 million have been provided by the U.S. Government through Foreign Operations Administration, to help 150 outstanding young European scientists to study and gain experience in American research institutions. The students will spend about two years in the States. The money was made available following a request from O.E.E.C. and will be extended in the first instance, until 1955. About 25 fellowships will be open to candidates from this country. No age limit is specified but most applicants will probably be in the 26 to 32 age group. Applications will be considered from those proposing to undertake research in natural sciences, engineering and other sciences, and candidates will have to possess a doctoral degree in science or have equivalent experience. Further details may be obtained from the Royal Society's Asst. Secretary, Burlington House, London, W.1.

Singapore's popular Happy World Park, scene of many bargaining stalls, dancing, Chinese lanterns and wrestling combats, was given over to a Trade Exhibition recently. Prominent among exhibitors were the G.E.C. whose display of cookers, radios, some lighting fittings and numerous other domestic appliances attracted a great deal of attention. An illuminated pool and corner garden was also a feature of the company's show in an effort to popularise garden lighting now that the city's electricity supply has increased

CONTACTORS AT BIRMINGHAM

MAGNETIC contactors of a specially compact design were amongst the products featured by Arrow Electric Switches Ltd. in a private exhibition staged in Birmingham last week. The whole display emphasised the advantages of the firm's products for machine tool applications. One special point worthy of attention is the identity, apart from a question of screw threads, with gear manufactured by an associated company in the U.S.A. This of course is a considerable advantage from the export viewpoint where control gear of this type is installed in British equipment.

Another aspect of Arrow production that the exhibition underlined to effect, is the attention that has been given to the special need for contactors in the up-to-10-h.p. range.

Larger Gifts to I.E.E. Benevolent Fund

TOTAL subscriptions during the past year have increased from £11,245 to £12,155, it is stated in the annual report of the Court of Governors of the I.E.E.'s Incorp. Benevolent Fund, to be presented at the annual meeting on October 14. Last year some concern was expressed over the decrease of about £1,800 in the amount subscribed and donated. Even so, however, expenditure exceeded income from this source by £278, and another urgent appeal is made. Grants totalling £8,989 have been made during the year reviewed to 123 beneficiaries, and at the same time assistance was gven to 98 of their dependants.

Smoke Abatement Annual Conference

ON Wednesday of next week, the twentieth annual conference of the National Smoke Abatement Society opens in Glasgow. Some 450 members and delegates are expected to attend. This will be the first conference since the London's "great fog" of last December, so that it is not surprising that the Des Vesex Memorial Lecture, possibly the most important session, will be on "Air Pollution in Relation to Preventive Medicine," by the Ministry of Health's chief medical officer, Sir John Charles.

PORTLAND PLAYERS

A DIFFICULT task was undertaken by the Portland Players in their latest production, "Across North Africa With a Pelican," which they presented at the Cripplegate Theatre last week, but they succeeded in putting up a most creditable performance. Sketches and parodies are always difficult for the non-professional, and when a parody of an amateur performance is given by amateurs there is always the danger that the intentional may be regarded as accidental. Among the large cast, particular mention should be made of Judy Cleave and Clifford Coffee.

NEWS IN BRIEF

Attendance during the 10 days of the Radio Show totalled 295,240—over 5,000 more than last year. Of that number, some 2,500 represented more than 100 countries overseas.

At a Conference on European TV matters earlier this month it was decided to postpone an England-France exchange of programmes from Christmas, 1953, in favour of a European TV week in June.

The combination of kitchen amenities with a living-room atmosphere is being demonstrated at Harrods, London. Much of the advice for this idea was provided by Mary Gilbert of E.D.A.

Restrictions on the use of molybdenum in alloy steel have been reprieved, the Ministry of Supply announced, following a statement by O.E.E.C.

We hear that the American General Electric Co. has decided to give five company shares to any employee whose baby arrives on October 15—the firm's anniversary.

Electric Supply News . . .

Douglas (I.of.M.)

The Corporation has been forced to raise its tariffs—we reported on September 10 that a loss of £17,562 resulted from operations in the past year. The increased charges will raise another £25,000 a year. Under the proposals the lighting rate will be raised by ½d. per unit, making it 8½d. for the first 1,000 units; the power rate becomes 2½d. a unit for the first 1,000 units (compared with 2½d. plus 10 per cent); while the domestic all-in rate will be 1½d. (previously 1d.) for the first 250 units p.q., and 1d. for all in excess (on the old tariff the second 250 units were at ½d., and all over at ½d. per unit). Further, the fixed charge of the all-in tariff is changed from 3½ per cent of the R.V. to 10d. in the £ of R.V. Other special rates are to be increased by 10 per cent.

When the Council discussed, and eventually approved, these increases, members referred to the position with the Isle of Man Electricity Board. Councillor R. C. Stephen said he wondered if the Electricity Committee could, even at this late stage, approach the Board and see if they could get together on questions of broad policy and reduce the losses of both undertakings. Councillor Radcliffe, chairman of the Committee, said that the latter were in agreement with that suggestion, but if the Committee and the Board were just put in a locked room until they agreed they would die of starvation. After explaining how they tried initially to come to an agreement, he suggested that the Lieutenant-Governor should appoint a commission of independent people conversant with the work of electricity undertakings to go into the question of electricity for the whole island. He thought if the Lieutenant-Governor had done that when they first went to Tynwald with the scheme, the picture might have been different now. Instead they found everything settled before they went to Tynwald, he declared.

Dunfermline

The B.E.A. has received the consent of the Minister of Fuel and Power to the extension of the Dunfermline power station by the installation of one 12,500 kW turbo generator and two 80 klb./hr. boilers. The station's present installed capacity is 13,000 kW.

Eire

The new Ringsend power station of the Electricity Supply Board is expected to be in operation by the end of 1954, judging from current constructional progress reports. Situated near the Board's existing Pigeon House power station, on the extension of the south bank of the River Liffey, the station will have three 30 MW steam turbo-alternators.

Monk Hesleden (Co. Durham)

At a special parish meeting the Parish Council was authorised to levy a special rate to cover the cost of converting the district's electricity supply system from d.c. to a.c. The cost will be £1,335 per annum for 15 years, equal to 11d. rate.

Norfolk

Progress made in providing an electricity supply in parts of Norfolk was discussed at a meeting of the Depwade Rural Council. Mr. A. N. Wright, chairman of the Council, reported that the Eastern Electricity Board's programme included supplies for the Wymondham road area at Bunwell in 1953-54, for Burston, Hempnall and Fundenhall in 1954-55, for Tivetshall, Shelfanger and Winfarthing in 1955-56 and for Billingford in 1956-57. No definite promises had been given for these installations, he added. They were, however, the Board's programme for the district and its representatives had promised to do their best to implement the programme.

North-Eastern

The North-Eastern Electricity Board have completed the supply of electricity to the Northumberland villages of Slaggyford, Burnstones and Knarsdale. The Board have offered to supply farms in the villages, if farmers would pay for the internal wiring of their premises. The cost to farmers is between £30 and £40 for each farm, it is stated. Although many farmers accepted this offer, others have refused because they did not want to pay the price asked.

Teddington

Many consumers in parts of Teddington are to have their supply systems changed over from d.c. to a.c. by the end of this year. A further number will be converted next year, but this will still leave many in central Teddington and Twickenham on d.c. for conversion at a later date.

LIGHTING SCHEMES

Cudworth (Yorks).—The U.D.C. has approved a scheme for the conversion of lighting on the main Barnsley-Pontefract road from gas to electricity, at a cost of £2,750.

Buxton.—It is proposed to go ahead with a £5,985 scheme for the conversion of street lighting in various roads from gas to electricity.

Horbury.—The U.D.C. is seeking consent to the borrowing of £1,000 for conversion of the main street lighting in Cluntergate and Northfield Lane from gas to electricity.

Uphall (W. Lothian).—The District Council is to proceed with the installation of street lighting for Broxburn and Uphall villages at a cost of £20,000.

Scarborough.—Housing Committee has approved proposals for the provision of further street lighting at Eastfield. Application is being made to borrow £5,755 for this work.

Company Activities . . .

Bennis Combustion Ltd.

The final Ordinary dividend is being raised by 2½ per cent to 7½ per cent, making a total distribution of 12½ per cent (as against 10 per cent previously) for the year ended April 30 last. The group net profit for the year amounts to £63,920 after charging increased taxation. This figure is £34,084 more than for the previous year.

Berry's Electric Ltd.

Operations during the year ended March 31 last resulted in a sharp drop in profits, indicative of the difficult conditions applying in certain sections of the industry. For the year under review the trading profit amounted to £48,242, compared with £84,736 for the previous year. After depreciation, interest on bank overdraft, taxation, etc., the net profit becomes £7,893 as against £26,728 for the previous period. The dividend is 5 per cent, absorbing £5,500. There is a reduction also in the stock and work-in-progress at March 31 last, the figure of £197,247 being over £57,000 below the total a year previously. But the bank overdraft has been reduced by about 50 per cent to £13,604. In view of these results, the report of Mr. Raymond Berry, chairman and managing director, will be awaited with interest.

Christy Bros. Ltd.

The trading of the parent company continues at about the same generally satisfactory level as that of the previous year, Mr. Frank Christy, the chairman, states. The electricity undertaking in Alderney which is being reorganised by this company has now been operating some eighteen months. The accounts for the first nine months ended December 31 last showed a small profit after a substantial sum had been provided for depreciation. Efforts are being made to increase the sales of electricity for domestic purposes. The turnover of Christy & Norris, Ltd. was increased by £22,262 to £416,913. More than half the increase was in respect of additional overseas orders. The total trading results of Christy Bros. (Wireless Relays) Ltd., showed a substantial increase while operating costs were slightly lower.

Year to Mar 31	£ Trading Profit	£ Net Profit	% on Ord.		Ord. Price	
			Earn'd	Paid	High	Low
1949	50,610	17,758	29	5	24/6	21/-
1950	85,689	30,472	35	6	24/-	18/3
1951	93,282	32,176	36	6	27/-	21/4
1952	83,829	23,802	21	7	22/3	18/9
1953	99,394	33,823	27	7	18/-	16/9

East African Power and Lighting Co.

With a final dividend of 4 per cent, the total distribution for 1952 is 7 per cent. The group profit for the year amounts to £301,983, compared with £310,426 for the previous year. That figure is struck after charging depreciation but before allowing taxation of £32,346 (*£28,237*).

Ever-Ready South Africa Ltd.

After charging depreciation and taxation, the net profit for the year ended June 30 last is £73,247 compared with £75,238 for the previous twelve months. The dividend is again 1s. 3d. per 5s. share.

James Howden & Co. Ltd.

The total distribution for the year ended April 30 last is maintained at 30 per cent with a final dividend of 22½ per cent. The net profit for the year is £706,335, compared with £1,109,502 for the previous period, before taxation.

Palestine Electric Corporation Ltd.

A severe setback has been suffered by this company, it is shown in the results for 1952. The net profit is reduced to £36,344 (compared with the previous year's £221,809), and this is only after including a substantial income tax refund amounting to £331,186. There is again no dividend. Last February new tariffs were negotiated with the Israeli Government, to operate from the beginning of the year. These were expected to lead to a substantial recovery in revenue and the resumption of dividend payments.

Vactric Ltd.

All indebtedness to H.M. Treasury has now been discharged, the directors state. This has been achieved by a substantial reduction in stocks, by the sale of the greater part of the redundant plant at Newhouse and other fixed assets referred to by the chairman in his statement last year, and without increasing the group's bank indebtedness over its level at March 31, 1952. The audited results for the year ended March 28, 1953, will be available early in October and will show a substantial loss, it is stated. The directors estimate that the group net loss, after all charges including interest and depreciation, and after providing for taxation, will amount to approximately £135,000. Each division of the company and its subsidiaries is maintaining steady sales both at home and abroad, and in recent months the group has traded at a profit.

Dividends Declared

British Aluminium Co.—Interim of 4% (*same*). But the directors warn that the difficult trading conditions mentioned by the chairman in May have shown little sign of improvement. They stress that the maintenance of the interim dividend should not be taken to mean that the total distribution will necessarily remain the same.

Cinema-Television Ltd.—Dividend of 17½% (*10%*).

W. T. Henley's Telegraph Works Co.—Interim of 2½% (5%) on doubled capital.

Thomas Bolton and Sons.—Interim of 2½% (*same*).

Vickers Ltd.—Interim Ordinary dividend of 2½%.

Commercial Information

CONTRACTS OPEN

HOME

Sept. 28.—Stockton-on-Tees T.C. Electrical installation at Roseworth junior school. Borough Architect, 28 The Square. Deposit £1 1s.

Sept. 28.—West Riding. Rewiring of installation at Batley Healey primary school. County Architect, "Bishopgarth," Westfield Rd., Wakefield.

Sept. 30.—Co. Down. Electric lighting and power circuits and fire alarm system at St. Leonards West, Warrenpoint. D. Whatmore Bell, Royal Ave., Belfast. Deposit £2 2s.

Sept. 30.—Dumfries T.C. Electrical installation in 45 terraced houses at Summerhill. Names by above date to J. Hutcheon, Municipal Chambers, Buccleugh Street.

Sept. 30.—East Riding. Installation of electrical services at Driffield secondary school. County Architect, County Hall, Beverley.

Sept. 30.—East Riding. Supply and fixing of electrically operated flasher units and illuminated beacons on pedestrian crossings. County Surveyor, County Hall, Beverley.

Sept. 30.—Manchester T.C. Cable, concrete and steel standards, lanterns, mantles and time switches included in list of supplies required during 1954. Documents from City Surveyor (Room 329), Town Hall.

Sept. 30.—N. Ireland. Electrical installation in administrative buildings and nurses' home, and rewiring in West House, at Fever Hospital, Purdysburn. Consulting engineers are F. W. Parkinson and Partners, 6 Murray St., Belfast. Deposit £3 3s.

Sept. 30.—Wokingham (Berks) R.D.C. Electrical wiring of 52 houses at Wargrave, Ruscombe and Wokingham Without. Surveyor, Council Offices, Shute End.

Oct. 1.—Ashton-in-Makerfield U.D.C. Supply of 28 concrete columns and lanterns for mercury discharge lighting for Old Rd. scheme. Surveyor, Town Hall.

Oct. 1.—Halesowen T.C. Supply and erection of 134 mercury discharge lamps, and concrete columns in class A. Borough Engineer and Surveyor, Council House. Deposit £2 2s.

Oct. 1.—Newbury (Berks) T.C. Electrical installation in 84 houses in Camp Close and 24 houses in Monks Lane. Borough Surveyor and Water Engineer, Municipal Buildings.

Oct. 1.—Tyrone. Complete electrical installation in Tyrone and Fermanagh Hospital, Omagh. N.I. Hospital Authority's Chief Engineer, 104 University, St., Belfast. Deposit £3 3s.

Oct. 2.—Walthamstow B.C. Supply of 255 sets of 140 W sodium discharge lighting and electrical equipment, for Forest Rd., Chingford Rd., and Hoe St. Borough Architect, Engineer and Surveyor, Town Hall, E.17. Deposit £2 2s. (See Sept. 17 issue.)

Oct. 3.—Ramsey (Hunts) U.D.C. Wiring of 26 houses at Mereside. Surveyor, Council Offices, 36 Great Whyte.

Oct. 5.—Manchester T.C. Electrical installation at Moss Nook secondary school, Wythenshawe. City Architect, Town Hall. Deposit £1 1s. (See Aug. 27 issue.)

Oct. 6.—Kirkcaldy T.C. Supply and installation of 450 electric cookers and same number of wash boilers. Burgh Engineer, Town Hall.

Oct. 7.—Chertsey U.D.C. Installation of Group B mercury discharge lighting along about 1,300 yards of London St. and Bridge Rd. Engineer and Surveyor, Council Offices, Guildford St. Deposit £1 1s.

Oct. 7.—Edinburgh T.C. Electrical installation in 221 houses at Chermiston. City Architect's Office, City Chambers.

Oct. 8.—Cork (Eire). Electrical installation at Municipal School of Music and Broadcasting Studio. T. H. Wain, consulting engineer, 59 South Mall, Cork. Deposit £10.

Oct. 10.—Haslemere U.D.C. Supply and erection of duplicate pumps together with electric motors and control gear at Shottermill sewage works. C. A. Best, Engineer and Surveyor, Council Offices, Museum Hill.

Oct. 10.—Wexford. Installation of electric kitchen equipment with additional lighting at District Mental Hospital, Enniscorthy. Padraig Mulcahy, chart. quantity surveyor, 62 Merrion Sq., Dublin. Deposit £10.

Oct. 12.—East Dereham U.D.C. Supply and erection of 48 mercury discharge lamps on 42 steel columns and 6 wall brackets in Group A along A.47. Council's Surveyor, Becclesgate House, Quebec St. (Advertised is this issue).

Oct. 12.—Halstead R.D.C. Supply of two sets of electrically-driven vertical spindle borehole type pumps and two vertical electrically - driven booster pumps plus all ancillary equipment. Engineers, John Taylor and Sons, Artillery House, Artillery Row, Victoria St., Westminster. Deposit £5.

Oct. 12.—Padiham U.D.C. Wiring for light and power in 24 bungalows in St. John's Road estate. A. J. Shaw, surveyor and engineer, Town Hall.

Oct. 12.—West Riding. Improvements to electrical installation at Batley Princess Royal Girl's secondary school. County Architect, "Bishopgarth," West field Rd., Wakefield.

Oct. 17.—Tyrone. Electrical installation in new buildings on Goolnafranky estate, Cookstown, at a grammar school, secondary intermediate school and dining-room. Chief Education Officer, Education Offices, Omagh. Deposit £3 3s.

Oct. 19.—Barrow-in-Furness. Supply and installation of three electric pumping sets for proposed pumping station of North Lindsey Water Board Engineer is Cyril Cooper, Comforts Ave., Scunthorpe. Deposit £2.

Oct. 19.—King's Lynn T.C. Two sets of electrically driven vertical unchokeable sewage pumps and ancillary equipment. John Taylor and Sons, engineers, Artillery House, Artillery Row, Victoria St., Westminster. Deposit £5.

Nov. 6.—Belfast T.C. Supply and erection of band type circulating water screening plant to deal with 4 million g.p.h. Merz and McLellan, consulting engineers, Carliol House, New-

castle-on-Tyne. Deposit £5 5s. (Advertised in this issue.)

No date stated.—Cheltenham R.D.C. Installation of electricity at 89 houses on 17 sites. E. H. Rosser, Surveyor, 20 Imperial Square.

No date stated.—Bucks. Supply of electrical measuring instruments, resistances, laboratory equipment including batteries, installation equipment, cables, and radio equipment for High Wycombe College of Further Education. Applications to D. E. Cooke, Chief Education Officer, County Offices, Aylesbury. (See Sept. 17 issue.)

No date stated.—N. of Scotland H.E. Board. Erection of distribution lines in South Angus. Kennedy and Donkin, 12 Caxton St., London S.W.1. Deposit £2 2s. (Advertised in this issue.)

OVERSEAS

Details of items marked • may be obtained on application to the Board of Trade, Lacon House, Theobalds Road, W.C.1, quoting reference.

Oct. 17.—Egypt. Installation of electric pumping stations and transformers, including auxiliary machinery, motors, switches, pumps, instruments, transformers for 33/66 kV 50 c/s at six locations. Documents from Chief Inspecting Engineer, 41 Tothill St., London S.W.1, at £E10.

Oct. 19.—U.S.A. Supply of distribution boards, fire control cabinet, distribution transformer and battery chargers for Central Valley project, California. (DS.-4023). Bureau of Reclamation, Denver Federal Center, Denver, Colorado. B.o.T. (Ref.: ESB 3830/53).•

Oct. 19.—Formosa. Supply of 2,000 metres of h.t. electric power cable (No. 236-5) required by Central Trust of China, U.S. Aid Div., 96 Po Ai Rd., Taipei, Taiwan, Formosa. B.o.T. (Ref.: ESB 4464/53).•

Oct. 20.—Uruguay. Tenders (No. 899) invited for turbo-generator with output of about 7 to 8 kW d.c. at 110 V for installation in medium-sized tug. Administracion Nacional de Puertos. B.o.T. (Ref: ESB 4349/53).•

Oct. 21.—South Africa. Tenders invited (No. 1771/1953) for supply of one 33,000 V 3-phase current-limiting reactor with normal rating of 270 A and max. short circuit rating of 3·7 kiloamperes. City of Cape Town Electrical Engineer, Electricity House, Strand St. B.o.T. (Ref.: ESB 4649/53).•

Oct. 22.—New Zealand. Supply of 25,000 6 V, metal filament switchboard lamps under tender No. P. and T. 150/6417, for Post and Telegraph Dept., Wellington. B.o T. (Ref.:ESB 3426/53).•

Oct. 22.—South Africa. Tender and Supplies Board, 271 Visagie St., Pretoria, invites tenders (S.O. 7554) for test equipment for use of Div. of Civil Aviation with radio beacons of frequency range 200-400 kc/s, 250 W and 2 kW power output B.o.T. (Ref.: ESB 4016/53).•

Oct. 23.—Australia. Brisbane City Council require supply (E.18/53) of seventy 415 V 3-phase "direct on line" contactor starters and four remote control and indication panels with spare parts. Chief Engineer and Manager, Dept. of Electricity, Kelvin House, Adelaide St., Brisbane. Specs. 10s. 6d. per copy. B.o.T. (Ref.: BES 4201/53).•

Oct. 28.—India. Supply of total of 52,200 yd electric cables to various specifications for Director General, Supplies and Disposals, Shahjahan Rd., New Delhi. B.o.T. (Ref: ESB 4206/53).•

Nov. 3.—Uruguay. Tenders invited (No. 3909/53: Spec. No 2221) for a 5 kVA and a 10 kVA single-phase transformer, by Usinas Electricas y los Telefonos del Estado. B.o.T. (Ref.: ESB 4349/53).•

Nov. 4.—New Zealand. Supply of 1,000 ft. p.v.c. sheathed, twin conductor, high frequency cable, for Post and Telegraph Dept. Director-General (Stores Div.), G.P.O., Wellington. B.o.T. (Ref.: E.S.B. 4225/53).•

Nov. 4.—Uruguay. Usinas Electricas y los Telefonos del Estado require motor generating set for arc welding comprising 3-phase motor fed alternatively by 220 V or 380 V 50 c/s, d.c. generator for continuous working with 250 A; and control equipment with at least one ammeter as well as current regulator. (Tenders No. 3910/53, Spec. No. 2222). B.o.T. (Ref: ESB 4347/53).•

Nov. 12.—Australia. Supply of ten three-pole relays for overall protection of 33 kV feeders with directly associated and connected power transformers. Feeders will operate at either 33,000 V or 22,000 V, and have a maximum route length of 15 miles. Sydney C.C., Queen Victoria Building, George St., Sydney. B.o.T. (Ref.: ESB 4017/53).•

Your Queries — Answered

"Hicon" heaters, address for spares? S.E.—Hutchinson Instrument Co. Ltd., Trinidad Wharf, Carnwath Rd., S.W.6. (23996)

Kubice Ltd., address of? J.C.—1 Dansey Place, Macclesfield St., Shaftesbury Ave., W.1. (24013)

"Monarch" radiators, makers of? R.B.—Cordwell Ltd., 158 Chesterfield Road, Ashford, Middx. (24027)

"WW" switchgear, makers of? J.L.—Wm. White (Switchgear) Ltd., Carlton Works, Coldharbour Lane, S.W.9. (24039)

"Triumph" time lag switches, makers of? E.G.—Triumph Mekaniske Vaerstreder, Vesterbrogade 128, Copenhagen, Denmark. (24051)

"Renscot" utensils, makers of? L.B.—Arthur McFarlane and Co. Ltd., Hillington Industrial Estate, Earl Haigh Road, Glasgow. (24068)

Turntable for display purposes to carry three cars weighing 7,200 lb., makers of? I.P.—Joseph Westwood and Co. Ltd., Napier Yard, E.14, make a turntable which is 15 ft in diameter and can carry 3½ tons. (24085)

"Voltascope" testers, makers of? A.W.—G. W. Turner, 4 New Market Place, Manchester 1. (24092)

The above are selected from questions we have answered this week. If you have a query, send it to us.

CONTRACTS PLACED

Dumbarton. Improved street lighting near Renton War Memorial, Metropolitan-Vickers Electrical Co. Ltd., £2,149.

Durham. Electrical installation at Haswell school, Doves (Darlington) Ltd., £1,580; same at Ryhope Robert Richardson grammar school, Electra Ltd., £3,400.

Hornsey (Middx.). Electrical installations at Highgate school, Strand Electric and Engineering Co. Ltd., £3,750.

Newcastle-on-Tyne T.C. Electrical work in £120,000 block of flats in Hindhaugh St., A. S. Lowery.

TRADE NOTES

Sales. National Plastic (Sales), Ltd., have been formed to handle the selling activities of British Moulded Plastics, Ltd., and Moulded Products, Ltd. Like the latter two concerns it will be a wholly-owned subsidiary of National Plastics, Ltd. The new firm will be administered from Avenue Works, Walthamstow, E.4, but there will be offices at Moulded Products, Ltd., Chester Road, Tyburn, Birmingham 24.

Agency. The Selson Machine Tool Co., Ltd., North Acton, have been appointed sole agents in the U.K. for five continental manufacturers of machine tools. These comprise three German firms: Richard Stuhlmann and Co. (keyseating machines), Alfred Gauthier G.m.b.H. (gear hobbing machines and precision automatics), and Prahoma-Werk Kehren and Co. (surface grinding machines); the French firm of Ets. de M. de Valliere (centre lathes and fine boring machines) and the Belgian Ateliers Peeters ('Hobmatic' gear hobbing machines).

Acquisition. Tube Investments, Ltd., have reached an agreement providing for their acquisition of W. H. A. Robertson and Co., Ltd., who design and manufacture rolling mills for all metals, wire-drawing machinery, tube manufacturing machinery, threading equipment and general engineering components. The company will continue to operate as a separate entity.

Expansion. Switchgear and Equipment Ltd. are negotiating with Scottish Industrial Estates to double the size of their present factory at Blantyre, it is reported.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	232½-235	—
,, (3 months)	219½-220	—
LEAD, good soft pig (foreign)	91-91½	108 0 0
TIN (99·99·76%) (Cash)	615-617½	—
,, ,, (3 months)	603-604	—
ALUMINIUM, commercial purity (del.)	150 0 0	—
ZINC	70-71	80 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	50 10 0	—
Mild Steel Tape (0·04 in.)	40 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

E. J. Bowman (London) Ltd. Resolution for voluntary winding-up passed at meeting of members on Sept. 14. At subsequent meeting of creditors, resolution was confirmed and P. Phillips, 76 New Cavendish St., W.1, appointed liquidator.

Jerome K. Jerome (Gosport) Ltd. Liquidator, A. W. Hunter of Latham and Co., Walter House, 418-22 Strand, London W.C.2, released as from July 13.

Gordon Hughes Electrical Co. Ltd. Meeting of members is to be held at 43 Silhill Rd., Solihull, on Oct. 19, at 2.30 p.m., to receive liquidator's report.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Bowstring. 719,837. Class 9. Aerials, etc. Belcher (Radio Services) Ltd., 57 Windsor Rd., Slough.

Halolight. 717,280. Class 9. Radio and television apparatus. Thorn Electrical Industries Ltd., 105-109 Judd St., W.C.1.

Multicon. 718,932. Class 9. Plugs and sockets. Painton and Co. Ltd., Kingsthorpe, Northampton.

Technograph. 717,645. Class 9. Printed electric circuits and components. Technograph Printed Circuits Ltd., 32 Shaftesbury Ave., W.1.

Touchlight. B719,003. Class 11. Electric table lamps. Hadrill and Horstmann Ltd., Farncombe Hill, Godalming, Surrey.

Unex. 719,253. Class 9. Aerials Shardlow Electric Wires Ltd., Moseley Buildings, 56 Moseley St., Manchester.

Zerostem. 719,443. Class 9. Thermostats. Rheostatic Co. Ltd., 94 Farnham Rd., Slough, Bucks.

BANKRUPTCY ACTS

Intended Dividends

Barrow-in-Furness. Robert E. Browne, electrical contractor, trading as Browne Bros. at 121 Market St., Dalton. Last day for receiving proofs, Oct. 3. Trustee is D. Atkinson, 14 Lowther St., Carlisle.

York. William P. Wann, trading as Electrical Service at 41A Petergate, and Grape Lane, York. Last day for receiving proofs, Oct. 5. Trustee is W. H. Meredith, Official Receiver, 29 East Parade, Leeds.

Public Examination

Brighton. Thomas J. Williams, refrigerator engineer, trading at 1 Western Garage, Farm Rd., Hove. Public exam. at Court House, Church St., Brighton, on Nov. 13 at 10.30 a.m.

Hastings. James H. Thompson and Henry A. Why, trading as Southern Radio T.V. Electrical Services at 52 Wellington Mews, Hastings. Meeting at Official Receiver's Office, 8 Old Steine, Brighton, tomorrow (Fri.) at 11 a.m. and public exam. at Town Hall, Hastings, on Oct. 27 at 2 p.m.

Application for Discharge

Stoke-on-Trent. William H. Collis, electrical engineer, trading at 59 King St., Fenton, Stoke. Hearing fixed for Oct. 22 at Town Hall, Hanley, at 10.30 a.m.

Release of Trustee

Ashton-under-Lyne. Stanley F. Bent, trading as S. F. Bent and Sons, electrical contractors, at 362 Ashton New Rd., Bradford, Manchester. Trustee was F. C. Ormrod, Official Receiver, 20 Byrom St., Manchester.

Stockport. George L. Milton and Arthur Coates, trading together as Electro Radio, at 44 High St., Buxton. Trustee was F. C. Ormrod, Official Receiver, 20 Byrom St., Manchester.

BUSINESS PROSPECTS

HOME

Abergavenny T.C. It is proposed to build 140 houses on Major's Barn site

Ashington (Northumb.). Wansbeck Hospital Management Ctee. have approved extensions at Ashington Hospital. Cost estimated at £200,000.

Banffshire. Scheme approved for conversion of Ladysbridge Mental Hospital into mental deficiency institution at a cost of about £100,000.

Barnes (Surrey) T.C. Revised plan in hand for erection of 62 flats at Priests Bridge.

Barnet (Herts) U.D.C. Further 41 flats to be built on Potteries site.

Bingley U.D.C. Construction of 34 houses on three sites. J. S. Lattin, Surveyor and Architect, Town Hall.

Blackburn T.C. Tenders may soon be invited for erection of eight shops on Higher Croft site and two on Green Lane site.

Blackpool T.C. Magee, Marshall and Co. Ltd., brewers, have prepared scheme for erection of 495 houses and licensed hotel at Carleton.

Blackpool. Plans approved for erection of food factory in Mowbray Drive for J. Fentiman, of 53 Kendal Ave.

Bradford. Bulmer and Lumb Ltd. propose to build £475,000 factory in Buttershaw area. Architects are Walker and Collinson, 12 The Exchange.

Brandon U.D.C. Permission to borrow £78,323 being sought for erection of 54 houses at Esh Winning.

Buxton T.C. Erection of 26 houses on Victoria Park estate. A. C. W. Ryland, Borough Engineer, Town Hall.

Chigwell U.D.C. Erection of 36 houses in Chigwell Row. Architects, Tooley and Foster, Midland Bank Chambers, Buckhurst Hill, Essex.

Chorley (Lancs) T.C. Scheme approved for erection of 79 houses and 12 flats on Liptrop Farm estate.

Coseley U.D.C. Construction of 52 houses and 6 bungalows at Old End site. J. C. Roper, clerk, Council House.

Darlington. H. B. Richardson, 3 Skinnergate, is architect for proposed offices at Four Riggs for C. M. Varley and Co. Ltd.

Dartford. Temple Hill is site for £350,000 development scheme of Burroughs, Wellcome and Co. Architects for new factory are Waterhouse and Rigby, London.

Durham. Authorisation received to spend £68,000 next year on first instalment of new technical college at Bishop Auckland.

East Sussex. Erection of Blackwell primary junior school, East Grinstead, and Willingdon secondary school. County Architect, County Hall, Lewes.

Edinburgh. Plans of S. and H. Smith Ltd. have been approved for proposed laboratories at Blanefield Chemical works.

Eston (Yorks). Scheme in hand for erection of Southbank primary school to cost about £45,730.

Exeter T.C. Erection of 144 dwellings on Whipton Barton estate. H. B. Rowe, City Architect, Municipal Offices.

Glasgow T.C. Tenders to be invited for supply and erection of three electrically driven hydro pumps at Baths and Washhouses premises at Govan. Estimated cost £2,000.

Grangemouth T.C. Dean of Guild Court has approved erection of 100 houses.

Hemel Hempstead. Factory is planned for Cass and Phillip Ltd. of Wealdstone.

Holborn. Cassell and Co. Ltd. are to start soon on erection of first part of new building in Red Lion Sq. Architects are Tubbs, Duncan and Osburn, 12 Grays Inn Sq., London W.C 1.

Huddersfield T.C. Erection of Almondbury county primary school. Borough Architect and Planning Officer, High Street Buildings.

Jarrow-on-Tyne. Permission sought to proceed with scheme for road tunnel under Tyne between Jarrow and Howdon. Cost estimated at £6 million. Engineers are Mott Hay and Anderson, 9 Iddesleigh Hse., London S.W.1.

Middleton T.C. It is proposed to build 307 houses, bungalows and cottage flats in Langley neighbourhood development unit. Also nearly 500 dwellings on Langley estate for Manchester City Council.

Motherwell T.C. Plans approved for construction of £135,000 civic centre.

Northumberland. Private architect to be appointed for proposed Wallsend Willington Quay infant school. Also, plans approved for Prudhoe secondary school.

Norwich T.C. Erection of 92 dwellings in Mansfield Lane. City Architect, City Hall.

Rowley Regis. Plans approved for factory in Powke Lane, Old Mill, for William B. Cull and Sons.

Southborough (Kent) U.D.C. Erection of 24 flats and 2 houses on Lady's Gift Farm site. Council's Architects, Howes and Jackman, 1 Verulam Buildings, Grays Inn, London W.C.1.

Staveley (Derby) U.D.C. Construction of old people's club at Poolsbrook. Engineer and Surveyor, Council Offices, Lowgates, Staveley.

Sunderland T.C. Erection of Hylton Red House primary school. Borough Architect, Grange House, Stockton Road.

Swansea T.C. Construction of 40 flats on Gendros estate. Borough Architect's Office, The Guildhall.

Uxbridge U.D.C. Erection of 63 dwellings at Hillingdon. H. E. G. Stripp, Engineer and Surveyor, 263 High Street.

Watford R.D.C. Construction of 90 dwellings on site at Cecil Lodge, Abbots Langley. Council's Architects, Dawe, Carter and Partners, 33 Clarendon Road.

Worcestershire. Erection of junior school at Norton, Stourbridge. Architects, Jackson and Edmonds, 116 Colmore Row, Birmingham 3.

Wrexham T.C. Erection of 197 dwellings on Queen's Park estate. J. M. Davies, Borough Engineer and Surveyor, 31 Chester Street.

OVERSEAS

Australia. Leo Rogaly and Lewis Pty. Ltd., 33 Bathurst St., Sydney, are interested in securing agencies for all types of electrical tools, specially drills, sanders, metal shears, disc polishers, etc.

Cuba. Comp. Cubana de Refrigeracion Electrica, of Calle 23 No.–53, La Rampa, Vedado, Havana, are expanding their activities to include domestic electrical appliances and would like offers from U.K. manufacturers. Of particular interest are fans, irons, food mixers, cookers and lamps. Write direct to St. Rodriguez.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London, W.C.2.

Acme Electric Co. (Finsbury) Ltd. Manufacturers of and dealers in electrical apparatus, etc. Cap.: £1,000. Dirs.: A. Joseph and J. I. Joseph, both of 21 Osidge Lane, N.14.

Didier-Kogag Construction Ltd., 11 Finkle St., Stockton-on-Tees, Co. Durham. Engineering, industrial, financial and business advisers and consultants; gas, oil, water, electrical and general engineers and constructors, etc. Cap.: £10,000. Dirs.: E. Bieneck, G. Collan-Jones, G. Melchos, P. A. Schwarz and H. Weittenhillier.

H. Evans Ltd., 182 Church Hill Rd., East Barnet, Herts. Designers and manufacturers of decorative metal work and lighting equipment, etc. Cap.: £150. Dirs.: H. Evans and Mrs. G. Evans.

Harold Wells (Electrical) Ltd. Manufacturers of and dealers in electrical and mechanical equipment, etc. Cap.: £2,000. Dirs.: by subs. Subs.: H. C. Wells, 44 Girdwood Rd., S.W.18, and C. Boyles, Milwood Hill Drive, Hove 4, Sussex.

London Hoist and Machinery Co., Ltd., 103 Worship Street, E.C.2. To take over business of electrical lift, cranes, winches and pulley blocks manufacturer and engineer carried on at Worship St., E.C.2, by Chas. P. Medley. Cap.: £10,000. Dirs.: C. P. Medley and G. C. J. Medley.

Plysu Sales Ltd. Selling agents in respect of domestic appliances, etc. Cap.: £2,500. Dirs.: To be appointed by the subs. Subs.: G. J. Boyes and A. W. Paterson, 1 Threadneedle St., E.C.

Prescott Engineers Ltd., 29/31 Cowcross St., E.C.1. Repairers and manufacturers of and dealers in general light engineering and electronic control gears, etc. Cap.: £100. Dirs.: W. O. Prescott and W. J. Prescott.

Radiocompact, Ltd., 1 Belmont St., Chalk Farm, N.W.1. Manufacturers of and dealers in electronic products of all kinds, etc. Cap.: £1,500. Dirs.: to be appointed by subs. Subs.: K. S. S. Spencer, 83 George St., W.1; and C. G. Tanner, Stafford House, Norfolk St., W.C.2.

Ristona Products, Ltd., Thryft Works, Solly Street, Sheffield 1. To take over the business of lighting fitting manufacturer carried on at 28 Newbould Lane, Sheffield, as "C. A. Whittington." Cap.: £1,000. Dirs.: K. D. Harrison and C. A. Whittington.

Signal Burglar Alarm Co. Ltd., Drayton House, Gordon St., W.C.1. Cap.: £100. Dirs.: J. L. Wood and R. C. Playfoot.

Smoothmaster, Ltd., 72 Tottenham Court Rd., W.1. Manufacturers of and dealers in electric shavers and other electrical goods and appliances, hair waving, drying and cutting machinery, etc. Cap.: £100. Dirs.: Florence Morris and T. Studdeard.

Townend Electrical, Ltd., 301 Westbourne Grove, W.11. Manufacturers of and dealers in electrical goods, wireless and television apparatus, etc. Cap.: £100. Dirs.: W. B. Garland and W. S. Townend.

H. Windass Ltd., 2 Hull Rd., Hessle, E. Yorks. Develop and turn to account business of plumber, electrician, painter, building and dealer in building materials carried on at Hessle, E. Yorks, by Harry Windass. Cap.: £1,000. Dirs.: H. Windass and A. M. Brown.

MEETINGS TO NOTE

THURSDAY, SEPT. 24

I.E.S. (Nottingham).—Chairman's induction. E. Midlands Elect. Board, Smithy Row, 6 p.m.

INCORP. PLANT ENGRS. (Sheffield). "Electrical Factory Regulations." H.M. Factory Inspector. Grand Hotel, 7.30 p.m.

TELEVISION SOC.—"Transitors and other Crystal Valves." D. D. Jones. Cinematograph Exhibitors' Assoc., 164 Shaftesbury Ave., W.C.2. 7 p.m.

FRIDAY, SEPT. 25

A.S.E.E. (Stoke and Crewe Branch).—"Estimating and its Relation to Economics of Electrical Contracting." W. H. Brooks. Copeland Arms Hotel, Stoke, 7.30 p.m.

I.E.S. (Bath and Bristol).—"Use of Lighting in Horticulture." J. J. French. S.W. Elect. Board, Old Bridge St., Bath, 7 p.m.

I.E.E. (E. Midland).—Buffet-dance at Welbeck Hotel, Nottingham, 8 p.m.

MONDAY, SEPT. 28

I.E.S. (Leeds).—"Stage Lighting." P. Corry. Priestley Hall, City Sq., 7.30 p.m.

E.P.E.A. (London).—"Earthing." P. W. Cave. Caxton Hall, Westminster, 7 p.m.

A.S.E.E. (Bournemouth).—"Diagnosis of Faults in Fluorescent Lighting Circuits." Mr. Mitchell. Grand Hotel, Firvale Rd., 8.15 p.m.

WEDNESDAY, SEPT. 30

BRIT. INSTN. OF RADIO ENGRS. (London Section). "Impact of Communication Theory on TV." D. A. Bell. School of Hygiene, Keppel St., W.C.1. 6.30 p.m.

SMOKE ABATEMENT SOC.—20th Annual Conference at City Chambers, Glasgow.

THURSDAY, OCT. 1

I.E.S. (Cardiff).—"Electric Discharge Lamps for Plant Irradiation." J. J. French. S. Wales Elect. Board, The Hayes, 5.45 p.m.

I.E.S. (Glasgow).—"Blended Light." S. Anderson. 39 Elmbank Crescent, 6.30 p.m.

I.E.S. (Nottingham).—Chairman's address by Norman C. Slater. Police Assembly Hall, Shakespeare Street, 6 p.m.

BRIT. INSTN. OF RADIO ENGRS. (North-West).—"Detection and Cure of Parastic Oscillations in Radio and Electronic Equipment." H. Whalley. College of Technology, Manchester, 7.15 p.m.

I.E.E. (E. Midland).—Discussion on "Overhead Distribution." H. W. Grimmitt and R. F. Proctor. Masonic Hall, Pinchbeck Street, Spalding, 7.30 p.m.

A.S.E.E. (S. London).—"Electrical Heat Treatment." Film by G.E.C., Café Royal, Croydon, 8 p.m.

FRIDAY, OCT. 2

I.E.S. (Birmingham).—Chairman's address by Howard Long. Regent House, St. Phillip's Place, Colmore Row, 6 p.m.

ELECT. TRADES' COMM. TRAVELLERS' ASSOC.—Annual dinner and dance at Café Royal, W.1, 7 p.m.

I.E.S. (N. Staffs.).—Chairman's address by Col. C. E. Calveley. Duncan Hall, Stone, 7 p.m.

A.S.E.E. (Liverpool).—"B.S.S. 7: 1953, The New Rubber and Plastic Cables: their meaning and future use." J. R. Cox. Liverpool Engineering Soc., 9 The Temple, Dale St., 7.30 p.m.

MANCHESTER ASSOC. OF ENGRS.—Inaugural address by President. H. Wright Baker. Engineers' Club, Albert Sq., 6.45 p.m.

EXHIBITION DIARY

Minibition. Held in conjunction with Purchasing Officers' Conf. at Brighton, Sept. 24 to 27.

Nursing. 38th Annual Exhbn. opens at Seymour Hall, London W.1, on Oct. 12 and closes on Oct. 16.

Engrng. Industries Assoc. London Regional Display at New Royal Horticultural Hall between Oct. 13 and 15.

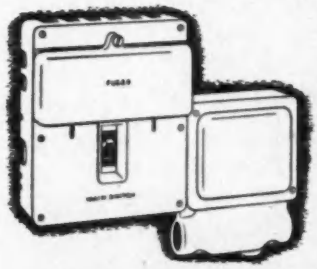
Motor Show. Opens at Earls Court, London, on Oct. 21 and closes Oct. 31.

Dairy Show. To be held at Olympia, London, between Oct. 27 and 30.

FLEXIBILITY

of arrangement

to suit all domestic installations



Please write for full details

FUSEWAYS INTERCHANGEABLE — unused ways shielded. The eight ways can be arranged in any desired sequence (5, 15 and 30 A) by use of the appropriate turrets which are interchangeable in the bases. The turret prevents householder inserting the wrong fuse carrier. Blanking covers shield unused ways.

COLOUR AID TO FUSING. Fuse-link, carrier and turret are coloured according to rating.

SPARE CARTRIDGE FUSES are kept in a handy compartment in the lid.

ROBUST MAIN SWITCH. HENLEY 60 A Double-pole Slow-break Switch.

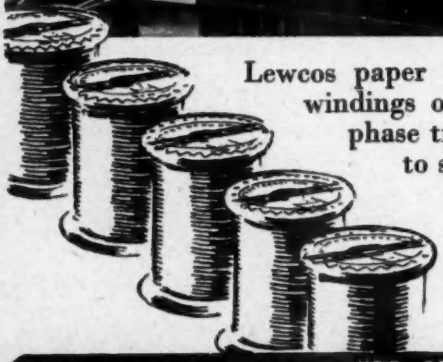
HENLEY

CONSUMERS' CONTROL UNITS

INSULATED TYPE

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD., 51-53 HATTON GARDEN, LONDON E.C.1

Lewcos PAPER COVERED WIRES



Lewcos paper covered wires are used in the windings of this 45 M.V.A. 132/30 kV, 3 phase transformer. We shall be pleased to supply full information for Paper and other types of insulated wires and strips.

Photograph by courtesy of C. A. Parsons & Co., Ltd.

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS, LIMITED
LEYTON, LONDON, E.10.
Incorporating FREDERICK SMITH AND COMPANY
Associated with THE LIVERPOOL ELECTRIC CABLE CO., LTD., AND VACTITE WIRE CO., LTD.

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY OF BELFAST

WATER SCREENING PLANT

TENDERS are invited for the supply, delivery and erection at the extension to Belfast Municipal Electric Power Station West of band type circulating water screening plant, to deal with approximately 4,000,000 gallons of water per hour at a depth of 11 ft. 6 in.

Form of tender (No. N.1414), conditions, specification and drawings, in quintuplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1, on payment of a deposit of five guineas, which will be refunded provided a bona fide tender is lodged and not withdrawn. Extra copies of the contract documents may be obtained at one guinea per set; this sum will not be returnable. Cheques should be made payable to the Belfast Corporation Electricity Department.

Each tender, in quadruplicate, in sealed envelope marked, "Tender for Circulating Water Screening Plant, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, November 6, 1953.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
September 18, 1953. (F 224)

EAST DEREHAM URBAN DISTRICT COUNCIL

GROUP "A" LIGHTING A.47

TENDERS are invited for the supply and erection of 48 No. MERCURY DISCHARGE LAMPS on 42 No. Steel Columns and six wall brackets giving 25 ft. mounting height together with wiring and fixing lanterns and auxiliary gear.

Conditions of Contract and Plans may be inspected at, and Specification and Forms of Tender obtained from, the Council's Surveyor, Becclesgate House, Quebec Street, East Dereham, Norfolk.

Tenders in plain sealed envelopes endorsed "A.47 Lighting" are to be delivered to the undersigned not later than Monday, October 12, 1953. The Council do not bind themselves to accept the lowest or any tender.

C. H. REEDER,
Clerk of the Council.

Quebec Road,
East Dereham, Norfolk.
September 12, 1953. (F 204)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

DISTRIBUTION LINES IN SOUTH ANGUS

TENDERS are invited for the erection of the above lines. Copies of the Tender Document may be obtained on application with cheque for Two Guineas (returnable) to the Engineers, Messrs. Kennedy and Donkin, 12 Caxton Street, London S.W.1.

The Board do not bind themselves to accept the lowest or any Tender.

W. D. D. FENTON,
Secretary.

16 Rothesay Terrace,
Edinburgh 3. (F 205)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

APPOINTMENTS VACANT

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division.

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department. Vacancy No. 22/53.

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with office and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department Vacancy No. 44/53.

Senior Draughtsmen are required in the Mechanical Section of the Construction Department at North Willford Power Station. Candidates should have experience in one or more of the following:—

(i) Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.
(ii) H.P. and L.p. steam and feed pipework. Condensing plant and feed heating systems.
(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement. Grade 5 (£567 to £671 per annum) and Grade 6 (£433 to £567 per annum) of Schedule "D" according to experience.

ENGINEERING DRAUGHTSMEN (ELECTRICAL)
Construction Department. Vacancy No. 61/53.

Candidates should have experience in the preparation of layouts and diagrams for the installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cables; knowledge of protective gear systems would be an advantage.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

SHIFT CONTROL ENGINEER
Longford Power Station, Coventry. Vacancy No. 104/53.

Applicants should have had a sound training and practical experience in a modern power station. The possession of technical qualifications is desirable.

The salary will be in accordance with Class "G," Grade 10 (£628 to £630 per annum) of the National Joint Board Agreement.

Closing date for this appointment will be October 12, 1953.

The above positions will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the dates stated. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(F 226)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY NO. 213/53. STATION SHIFT CONTROL ENGINEER at Bury Generating Station. Salary £555-£569 (E. 10).

Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before October 3. Please quote vacancy Number. (F 214)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

THIRD ASSISTANT ENGINEERS
(System Control)—(Shift)

Engineers are required for training as Distribution System Control Engineers. Applicants should have had reasonable practical experience in the operation of large distribution systems operating at voltages up to 33kV and should be Corporate Members of the Institution of Electrical Engineers, or possess equivalent qualifications.

Candidates who, after training, are found suitable will be appointed as System Control Engineers (Grade 4 AX-DX £763/976) to staff new control centres which are to be set up in the area.

Salary—N.J.B. Grade AX-DX5 commencing within the range £649-790 per annum, rising to £858 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Secretary, Yorkshire Electricity Board, Wetherby Road, Scarcroft, Leeds, not later than October 8, 1953.

No. 2 (Huddersfield) Sub-Area

GENERAL ASSISTANT ENGINEER
(Meters, Testing and Protection)

Applicants must hold the Higher National Certificate in Electrical Engineering or possess equivalent qualifications and should have had experience in the commissioning and maintenance of protective gear, and in the work of a Class "A" Meter Testing Station.

Salary: N.J.B. Class K, Grade 13, £583/605 per annum.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 2 (Huddersfield) Sub-Area, Yorkshire Electricity Board, Market Street, Huddersfield, not later than October 8, 1953. (F 212)

GOLD COAST LOCAL CIVIL SERVICE

VACANCIES exist in the Local Civil Service of the Gold Coast (Posts and Telegraphs Department) for three ASSISTANT WIRELESS ENGINEERS/ENGINEERS (CDE 108/13/04).

Appointments are on contract in the salary scale £1,130-£1,530 per annum, but candidates who have reached the age of 28 years and who have completed five years experience after obtaining the qualifications stated below, would be appointed to the salary scale of £1,600-£2,020 per annum. A gratuity of £37 10s. for each completed three months satisfactory service is also payable.

Free first-class passages are provided for the officer, his wife and children up to three in number under the age of 13. Government quarters if available are provided at a rental of £75 to £90 per annum. Leave is granted at the rate of seven days for each month of resident service after a tour of eighteen to twenty-four months.

Candidates should be under the age of 45 and must have passed or be exempt from Sections A and B of the examination for Associate Membership of the Institution of Electrical Engineers. They should, in addition, have had considerable experience with a leading manufacturer or the General Post Office, including experience with h.f. and v.h.f. fixed and mobile equipment and air and sea navigational aids. Some knowledge and experience of power generation would be an advantage.

Apply in writing to the Director of Recruitment, Colonial Office, Great Smith Street, London, S.W.1, giving briefly age, qualifications and experience. Mention the reference number CDE/108/13/04. (F 217)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

GENERAL ASSISTANT ENGINEER required, to be based on the No. 4/5 Sub-Area Headquarters, near Wrexham. Salary £552 to £573 p.a. (N.J.B. "J/13").

The duties will be mainly concerned with survey work in the general development of rural areas. General experience in the layout and construction of h.v. and m.v. overhead lines is necessary, particularly in the survey and profiling of routes. Possession of the H.N.C. in Electrical Engineering, and also ability to speak Welsh, will be advantageous.

Standard application forms obtainable from the Manager, No. 4/5 Sub-Area, Electricity House, Rhostyllen, near Wrexham.

RECORDS DRAUGHTSMAN required in the Engineering Department at the Board's Headquarters, Liverpool. Salary within the range £380 to £470 p.a. (N.J.C. Grade 1).

Applicants should have some general experience in a drawing office of the preparation of plans and schedules, and be able to prepare map records of overhead lines and underground cables from information obtained directly on site. A sound knowledge of ordnance survey maps is desirable.

Standard application forms obtainable from the Establishments Officer, Electricity House, Love Lane, Liverpool 3.

The appointments are superannuable and subject to medical examination. Closing date October 5, 1953. (F 196)

BRITISH ELECTRICITY AUTHORITY

Southern Division

S/13.439

APPLICATIONS are invited for the following position in the Divisional Secretary's Department:—

SENIOR ASSISTANT
to Estates and Wayleave Officer

Candidates should have a sound knowledge of all estate and land agency duties and be conversant with the present procedure under the Town and Country Planning and Agricultural Act. They should also have had experience in the negotiating of easements, including negotiations with public and other authorities. Applicants whose practical experience is limited, but who possess a recognised professional qualification, will also be considered. Possession of a car is desirable, for which allowances will be paid.

Salary, N.J.C. Grade 6 (£700-£775).

Special application forms, obtainable from P. D. A. Oliver, Divisional Secretary, 111 High Street, Portsmouth, must be returned by October 12, 1953. (F 238)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:—

GENERAL ASSISTANT DISTRICT COMMERCIAL ENGINEER.
Wolverhampton

Experience necessary in Contracting, Estimating, Consumer Services and Apparatus Reconditioning. Technical qualifications desirable. Salary £607/£628 p.a. (N.J.B. Grade H.11).

Apply, within 14 days stating age, experience, present salary and position to Sub-Area Manager, Midlands Electricity Board, 83, Darlington Street, Wolverhampton.

THIRD ASSISTANT DISTRICT ENGINEER
Severn Vale

Experience necessary in all branches of Distribution Work including operation and maintenance of high and low voltage underground and overhead systems, substations, etc. Technical qualifications desirable. Salary £587/£600 per annum (N.J.B. Grade E.9).

Apply within 14 days, stating age, experience, present salary and position to Sub-Area Manager, Midlands Electricity Board, 126 London Road, Gloucester.

A. STEPHENS,
Secretary.
(F 209)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London Allowance, and conditions of service in accordance with N.J.B. Agreement. Schedule "A." Qualifications entitling to Graduate Membership of the I.E.E. or I.Mech.E. unless otherwise stated.

DEPUTY STATION SUPERINTENDENT
Wimbledon Generating Station.

Applicants should preferably be Corporate Members of the I.E.E. or I.Mech.E. A wide knowledge of the operation and maintenance of generating stations is essential together with sound administrative ability. Salary: Class "E," Grade 3, £900 18s. p.a.

JUNIOR ENGINEER
West Ham Generating Station.

Practical experience of generating station plant. General duties in station. Salary: Class "H," Grade 14, £524 p.a.

Application may be made on form obtainable from Divisional Secretary, B.E.A., London Division, Generation House, Great Portland Street, W.1, and be received within 14 days of this advertisement. (F 228)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

ENGINEERING DRAUGHTSMAN (ELECTRICAL) is required in the Generation Construction Department, Divisional Headquarters. N.J.B. service conditions, superannuable appointment, salary within Schedule "D." Grade 5, £567 to £671 per annum, or Grade 6, £433 to £567 per annum, according to experience and qualifications.

A sound technical training is required and experience in the preparation of layouts and diagrams for the installation of m.v. and l.v. switchgear, control panels and distribution gear. A knowledge of the routing and scheduling of auxiliary and control cables would be an advantage.

Apply on Form AE6, quoting Vacancy No. 524 MD, available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, by October 10, 1953. (F 229)

BRITISH ELECTRICITY AUTHORITY

South West Scotland Division

GENERAL ASSISTANT ENGINEERS
Generation Operation Department

BRITISH ELECTRICITY AUTHORITY, South West Scotland Division, require General Assistant Engineers. The successful applicants will be required to carry out ultrasonic examinations of boiler drums in the various power stations throughout the division and to assist with other non-destructive testing and in the general work of steam plant testing.

Applicants should preferably hold the Higher National Certificate in mechanical or electrical engineering. Knowledge of ultrasonic testing, electronics and/or steam plant testing will be an advantage. The salary will be within the range £501-£639 per annum, reaching an eventual maximum of £675 per annum.

Applications on Form AE6 which may be obtained from the Authority's Headquarters or from any Divisional Office of the Authority should be forwarded to the Divisional Secretary, 168 Broomhill Drive, Glasgow, W.1, before October 12, 1953. (F 215)

EQUATORIA PROJECTS BOARD

Anglo-Egyptian Sudan

THE PRODUCTION DIVISION of the Equatoria Projects Board requires an ENGINEER with good practical training and experience for the maintenance of electrical installations, power and lighting plant including low voltage generation and overhead distribution system. Knowledge and experience of Mechanical Engineering and Diesel Engines will be an advantage. Age limits 25-35.

Appointment will be on probation for short term contract in the salary scale £E825 to £E1,500, starting rate of pay will be determined according to age, qualifications and experience. There is at present NO INCOME TAX in the Sudan. Eighty days' home leave on full pay is normally granted annually after the first tour.

Application forms will be sent on receipt of a postcard only addressed to The Sudan Agent in London, Sudan House, Cleveland Row St. James's, London, S.W.1. quoting "Engineer E.P.B. 2306" and name and address in BLOCK LETTERS. (F 211)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the post of:

SHIFT CHARGE ENGINEER
Little Barford Generating Station

Salary, Class "G," Grade 7, £729-£758 per annum.

Applicants should have served an apprenticeship and obtained a Higher National Certificate in Electrical and/or Mechanical Engineering or equivalent and possess experience in the operation of generating stations. Experience with steam plant operating at 650 lb. per square inch will be an advantage.

There is a possibility of housing accommodation being available for the successful candidate.

Apply by October 3, 1953, giving age and details of qualifications and experience to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14.

W. N. C. CLINCH,
Controller.
(F 216)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

SHIFT CONTROL ENGINEERS (five) required at the Bold Power Station, near St. Helens. Salary £608-£630 per annum, Class "G," Grade 10 N.J.B. Superannuable and subject to medical examination. Applicants must have had experience in the control room of a modern power station. Qualifications entitling the applicant to graduate or student membership of an appropriate institution would be an advantage. Application forms may be obtained from the Divisional Secretary, Beaconsfield Road, Woolton, Liverpool. Closing date: Monday, October 5, 1953. (F 218)

BRITISH ELECTRICITY AUTHORITY

Southern Division

A VACANCY exists at Poole Generating Station for a CHARGEHAND INSTRUMENT MECHANIC. Applicants must have the ability to supervise skilled tradesmen and have experience in the maintenance of Power Station instruments, including Multelecs, flow meters, pyrometers and automatic controls. Some knowledge of electronics is preferred.

N.J.I.C. Conditions of employment. Rate of pay 3s. 10d. per hour.

Applications to the Station Superintendent, Poole Generating Station, Rigler Road, Poole, Dorset; by October 2, 1953. (F 210)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following positions:—

THIRD ASSISTANT (SUBSTATIONS) S/13.438
Transmission Department, Divisional Headquarters

Applicants should have had experience in the design, layout and installation of substations employing switchgear up to a working voltage of 132 kV and transformers up to 60 MVA capacity.

A knowledge of overhead line and underground cable work and experience of the supervision of site erection is necessary.

Applicants should possess qualifications leading to corporate membership of a senior engineering institution or hold equivalent qualifications.

Salary, N.J.B. "AX/CX" Grade 5, £649-£835.

THIRD ASSISTANT ENGINEER (MECH.) S/13.433
Construction Department, Marchwood Site

Applicants should preferably be corporate members of a recognised professional institution or hold qualifications leading to corporate membership. Manufacturing works experience and practical experience in the mechanical aspects of power station construction and design are desirable and experience in site construction would be an advantage.

Salary, N.J.B. "AX/CX" Grade 5, £649-£835.

Special application forms, obtainable from P. D. A. Oliver, Divisional Secretary, 111 High Street, Portsmouth, should be returned by October 7, 1953. (F 239)

KARACHI ELECTRIC SUPPLY CORPORATION LTD.

Karachi, Pakistan

APPLICATIONS are invited for the post of MANAGER of the Corporation. Scale: Rs. 2,000-100-2,500-100-3,000 per mensem with no allowances other than car allowance of Rs.200 per mensem. (£1 equals about Rs.9.) Salary in the above scale according to qualifications and experience. Higher salary than the maximum of the scale will be considered for deserving applicants. Residential accommodation will not be provided. The Corporation operates a steam power station at West Wharf equipped with five turbo sets each 5,000 kW at 11 kV, with 400 lb oil-fired boilers, also a diesel station of total output of about 6,000 kW. The steam station runs in parallel with the diesel station. Transmission and distribution are at 11 kV, 6·6 kV and 0·4 kV with annual energy sales of 70 million kWh. Second steam station equipped with two 15,000 kW turbo sets, oil-fired boilers and 33 kV switchgear will come into commission in 1955. Applications marked "Application" on the envelope should be addressed to Mr. A. G. Khan, M.Sc. (Tech). (Manchester), M.I.Mech.E., M.I.E.E., Managing Director (Agents), Karachi Electric Supply Corporation, Ltd., Electric House, Elphinstone Street, Karachi, Pakistan, giving full particulars of age, qualifications and experience, also posts held and salaries drawn during the last 10 years. (F 191)

SOUTHERN ELECTRICITY BOARD

BRANCH INSTALLATION ASSISTANT

SWINDON DISTRICT of No. 2 (Newbury) Sub-Area, Faringdon Branch. Salary, N.J.B. Class "E," Grade 11, Column 1 (£524). N.J.B. conditions of service.

Applicants should have sound experience in preparation of specifications and estimates for all types of electrical wiring installations, particularly industrial work. Candidates should be competent to supervise electricians and organise allocation of work.

The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme, if eligible.

Applications on forms obtainable from the Sub-Area Secretary, 7 Oxford Road, Newbury, Berks, and returned to him not later than October 5, 1953. (F 225)

BRITISH ELECTRICITY AUTHORITY

South Western Division

SECOND ASSISTANT STATION CHEMIST required at Portishead "A" Generating Station.

Superannuation Scheme. Salary, N.J.B., Class "J," Grade 11, £639 to £665.

Applicants should have had practical experience in the analysis of coal, water, oil etc., for generating stations. Preference given to candidates possessing H.N.C. in chemistry or equivalent. Successful applicant will be required to carry out routine chemistry duties mainly of an analytical nature.

Applications on Form A.E.6/ACT, obtainable from the Divisional Secretary, 26 Oakfield Road, Bristol 8, should be completed and returned by October 12, 1953. (F 227)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

SHIFT CONTROL ENGINEERS (five) required at the Connah's Quay Power Station, North Wales. Salary £608 to £630 per annum, Class "G," Grade 10, N.J.B. Superannuable and subject to medical examination. Applicants must have had experience in the control room of a modern power station. Qualifications entitling the applicant to graduate or student membership of an appropriate institution would be an advantage. Application forms may be obtained from the Divisional Secretary, Beconsfield Road, Woolton, Liverpool. Closing date: Monday, October 5, 1953. (F 230)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, a SECOND ASSISTANT in the Commercial Department, Western Sub-Area, based at Tenby.

Applicants must have had experience in advising consumers on all aspects of the application of electricity to agriculture and horticulture.

Salary in accordance with Class "G," Grade 7 (£729 to £744 to £758) of N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by October 10, 1953.

D. G. DODDS,
Secretary.
(F 231)

MIDDLESEX COUNTY COUNCIL

County Architect's Department

ELECTRICAL ENGINEERING ASSISTANT required. Apt. IV (£555-£600 p.a., plus London weighting). Established subject to medical assessment and prescribed conditions. Appointment at grade minimum. Should be able to prepare plans and specifications and have practical experience in wiring installations in large buildings and design of electrical schemes. Also able to work with minimum of supervision. Application forms (stamped addressed envelope foolscap) from County Architect, 1 Queen Anne's Gate Buildings, Dartmouth Street, S.W.1, returnable by October 9 (quoting M.475, E.T.). Canvassing disqualifies. (F 213)

AIR MINISTRY require MECHANICAL and ELECTRICAL ENGINEERS in Works Department for design, operation and maintenance of ground mechanical and electrical works services on R.A.F. stations at home and overseas and Civil Aviation stations. Appointments in two grades (a) Main Grade, starting salary, £970 rising by eight annual increments to £1,280 per annum; (b) Assistant Grade, starting salary, age point viz. age 25 £628 per annum rising to £875 at age 34 thereafter rising annually to £970 per annum. Salaries somewhat lower in provinces. Appointments temporary and non pensionable but with long term possibilities. Special allowance up to £1,300 a year according to location payable in addition to salary during overseas service. Candidates must be natural born British subjects. Minimum qualifications and experience for both grades of posts:—(i) (a) University degree or equivalent diploma in electrical and/or mechanical engineering and at least a two-year apprenticeship or (b) Graduate or Corporate Membership of the Institutions of Mechanical or Electrical Engineers with appreciable electrical engineering experience and at least a three year apprenticeship and (ii) employment in responsible position for minimum of three years with well established engineering concern providing wide experience in electrical and mechanical engineering practice.

Application forms quoting reference D 290/52A from M.L. and N.S., Technical and Scientific Register (K), Almack House, 26, King Street, London, S.W.1. (F 206)

A LARGE MERSEYSIDE ELECTRICAL ENGINEERING COMPANY urgently requires SALES/CONTRACTS ENGINEERS in connection with high rupturing capacity fusegear. Higher National Certificate standard is preferred, age up to approximately 30 years. Training would be given to suitable applicants.—Reply stating age, qualifications and present employment to Box No. 2929, Electrical Times, quoting ref. D.D.C. (F 197)

AN OPPORTUNITY occurs for University Graduates in a well-established progressive cable manufacturing company in the Greater London area. The successful candidates holding arts, science or engineering degrees would be trained for MANAGERIAL appointments. Salary according to qualifications and experience (if any).—Box No. 2907, Electrical Times. (F 149)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

A QUALIFIED industrial CHEMIST is required and should be capable of progressing to the position of chief chemist. He should preferably have experience of extrusion plastics and/or cable making. Salary according to qualifications and experience; the appointment is permanent and pensionable.—Box No. 2905, Electrical Times. (F 148)

ASSISTANT DISTRICT ENGINEER, Cupar, Fife, Class "E," Grade 7. Operation and maintenance rural overhead and underground up to 33 kV. Higher National Certificate or equivalent. Write particulars, age, experience, qualifications before October 10.—South East Scotland Electricity Board, East Port, Dunfermline, Fife. (F 201)

CENTRAL London drawing office of The English Electric Co., Ltd., has vacancies for MECHANICAL DRAUGHTSMEN to be engaged on high-voltage switchgear. Good workshop and D.O. experience essential, as the positions carry responsibility for detail design for most efficient production. Excellent canteen facilities available.—Write, quoting Ref. 112M, to Dept. C.P.S., 336-7 Strand, London W.C.2. (F 162)

CONTRACT ENGINEERING APPOINTMENTS are available with The English Electric Company, Ltd., on important work covering all classes of electrical equipment. These appointments are pensionable after a qualifying period and apprentice trained men with Higher National Certificate in Electrical or Mechanical Engineering or equivalent, and the previous experience on contract work are required. Experience in the manufacturing or power supply industries or in the application or installation of electrical equipment in any branch of industry or engineering is an alternative qualification, and professional engineers in these fields are also invited to apply. A number of vacancies also exist for APPRENTICE-TRAINED ENGINEERS who have not yet had any opportunity of acquiring contract experience.—Apply, quoting Ref. S.A.33B, to Dept. C.P.S., 336-7 Strand, W.C.2. (F 190)

DENIS FERRANTI METERS, LIMITED, Bangor, North Wales, have vacancy in Design Laboratory for ENGINEER experienced in design of Watthour meters or similar mechanisms. Good opportunity, in expanding department, for man able to work under own initiative. Salary £600 to £700 p.a. (F 219)

DESIGNER required by old-established manufacturers of electrical accessories, 30 miles south-west of London. Sound electrical knowledge essential, coupled with initiative, drive and flair for new ideas.—Write stating experience, qualifications and salary required, to Box No. 2921, Electrical Times. (F 177)

ELECTRICAL ENGINEER required for design and development. F.H.P. Motors for aircraft fuel system accessories. Main qualifications Higher National Certificate, electrical engineering. Practical experience of winding and diagnosis of motors desirable. Required to supervise and carry out test work on prototypes, and advise on production problems.—Write stating age, training and salary required to Self-Priming Pump and Engineering Co., Ltd., Trading Estate, Slough, Bucks. (F 207)

ELECTRICAL ENGINEER required for modern sawmills in North Borneo. Applicants must be fully qualified and able to take responsibility for maintaining all electrical plant. First tour of four years; good salary and allowances; leave and pension scheme; passages paid.—Apply Box No. T.3693/4, Foster Turner and Everetts, Ltd., 11 Old Jewry, E.C.2. (F 198)

PERMANENT POSITIONS

with excellent opportunities, will be offered to applicants suitably qualified for the following:—

(a) DESIGNERS experienced in electronic control gear. Good electrical and mechanical design and layout ability essential

(b) SENIOR DRAUGHTSMEN with electrical/mechanical experience required for motor control gear, knowledge of electronics advantageous. Thorough shop training and extensive drawing office experience essential.

(c) DRAUGHTSMEN required for mechanical and electrical work on industrial electronic equipment. Experience on this type of product whilst an advantage is not essential and men with good electrical or mechanical drawing office experience will be considered.

Vacancies exist in a new factory in the Stoke-on-Trent area. Replies giving full details of training experience, also age and salary required, and quoting Ref. AG1 to be sent to Box No. 2915, Electrical Times. (F 164p)

ELECTRICAL ENGINEER required with comprehensive knowledge and experience in design of electrical control systems, and the application of electronic equipment. Candidates must be of A.M.I.E.E. standard. The position offers permanency and scope for advancement. Salary according to age, qualifications and experience. Non-contributory pension scheme.—Apply by letter to Personnel Department, Kodak, Ltd., Wealdstone, Middlesex. (F 220)

ELECTRICIAN required for Middle East. Experienced in use of conduit, Pyrotenax, earthing, etc.—State age, experience, with copies of testimonials or names to whom we may apply to Box No. 2909, Electrical Times. (F 152)

JOHNSON AND PHILLIPS invite applications for the appointment of CHIEF RUBBER TECHNOLOGIST, to fill a vacancy which will shortly be created by retirement.

Applicants should hold scientific qualifications of University Degree or comparable standard, and must possess extensive experience in senior capacity of the design and manufacture of rubber and thermoplastic cables with intimate knowledge of materials and compounds. They will be expected to be thoroughly familiar with the principal British and foreign cable specifications.

The duties involve overall responsibility to the Cable Test and Research Manager for all routine technical work relating to rubber cables and materials and for research and development. They cover laboratory activities, supervision of factory processes and assessment of cable design and performance. Particular importance is attached to competence in dealing with customers' inquiries and other technical problems relating to installation and operating conditions for rubber cables of all types.

Applications, giving full particulars of age, education, training experience and salary required, should be sent to Employment and Welfare Manager, Victoria Way, Charlton, S.E.7, marked Rubber Technologist and will be treated with the utmost confidence. (F 232)

OVERHEAD LINESMAN required for Middle East, experienced in erection of steel and wood poles and lines up to 33 kV.—Apply, stating age, experience and forward copies of testimonials or state names to whom we may apply, to Box No. 2911, Electrical Times. (F 153)

OVERHEAD LINESMEN, wood pole, required for work in Central Scotland. Good hours and out-living allowances.—Apply to: James Kilpatrick and Son, Ltd., Kelvin House, River Cart Walk, Paisley. (F 202)

POWER STATION INSTRUMENT ENGINEER required by the Kuwait Oil Company for service in Kuwait. In addition to A.M.I.E.E. or similar qualification must have received full training with firm of electrical instrument manufacturers or in a power station and have some subsequent experience in the calibration and repair of all types of instruments used in a modern power station. Age under 35. Salary starting £910 p.a. clear, plus generous allowances, pension scheme and kit allowance. —Write for application form, giving brief details and quoting K.1744, to Box B/36, c/o 191 Gresham House, E.C.2. (F 165)

SALES ENGINEER wanted for manufacturers of automatic temperature controls. Good sales record and sound technological training essential. Age 25-35.—Send details to Box No. 2925, Electrical Times. (F 180)

SHIFT CHARGE ENGINEER for Electricity Supply Undertaking in Baghdad. Applications are invited from suitably qualified Engineers, preferably between 25 and 35 years of age, who have had experience in the operation of a power station of at least 15,000 kW, with medium pressure boilers. Salary £1,000 to £1,200 per annum, plus high cost-of-living allowance. Free house with heavy furniture will be supplied or a monthly house allowance of £12, in lieu.

Three-year contract, renewable, with first class passage each way for successful applicant and family (if married). Three months' leave on full pay in U.K. on completion of 24 consecutive months in Iraq, first class leave passages being paid.—Box No. 2935, Electrical Times. (F 233)

TELEPHONE CABLE MAKERS have a vacancy in their outside installation department for an ENGINEER or ASSISTANT MANAGER with an engineering degree. Location in London, but considerable travelling may be necessary. Salary according to qualifications and experience; the appointment is permanent and pensionable.—Box No. 2903, Electrical Times. (F 147)

TEST BED experience on L.T. hand and automatic contactor equipment offered to young WIREMAN or man, with some practical electrical experience, by expanding Merseyside firm.—Box No. 2927, Electrical Times. (F 182)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

JOHNSON & PHILLIPS, LIMITED

APPLICATIONS are invited from Electrical Engineers for senior positions in the Company's India and Pakistan organisations.

The Company has long established organisations in the territories for the sale of the Company's products which include cables, transformers, switchgear, capacitors and domestic electrical equipment. The Company also maintains Contract Departments for complete industrial and other electrification schemes and the installation of the Company's products. In addition, the Company has a factory in Pakistan for the manufacture of switchgear and, in collaboration with an associated company, a similar factory in India.

Candidates must have had considerable technical and commercial experience in some or all of the foregoing activities such as to enable them to take executive positions leading possibly to management.

Candidates should preferably be not more than forty years old.

Applications (which will be treated in strict confidence) should be as complete as possible and should be addressed to:—

The Managing Director,
Johnson & Phillips, Ltd., Charlton, London S.E.7
(F 110p)

TECHNICAL ASSISTANT required by W. T. Glover and Co. Ltd., Trafford Park, Manchester, manufacturers of paper insulated cables up to the highest voltages. Degree or H.N.C. standard desirable. Situation calls for dealing with technical inquiries, specifications and general technical matters. Age 22 to 30 years. Salary in accordance with qualifications and experience. Good prospects. —Applications should be addressed to the Secretary. (F 240)

TECHNICAL ENGINEER required by cable manufacturers in the Midlands. Applicants should be Associate Members of the Institution of Electrical Engineers or equivalent, and should possess a sound knowledge of cable design, testing and manufacture. A knowledge of super tension manufacture and testing technique is desirable. Superannuation scheme available. Applicants should apply in confidence stating age, experience, and salary required.—Box No. 2937, Electrical Times. (F 234)

TECHNICAL REPRESENTATIVE required by leading electric cooker manufacturer for Yorkshire area but based on Leeds. Essential to have experience and connections with Electricity Boards.—Full particulars including salary required, etc. to Box No. 2933, Electrical Times. (F 221)

THE ENGLISH ELECTRIC COMPANY requires a DEMONSTRATOR for the Yorkshire Area, to be centred on Leeds; and a demonstrator for the Midlands Area, to be centred on Birmingham. A good domestic science background is required, together with sales experience and a knowledge of domestic electrical appliances.—Reply quoting ref. 1027A, to Dept. C.P.S., 336/7 Strand, London W.C.2. (F 150)

TRANSFORMER CONTRACTS ENGINEER required, familiar with Association procedure.—Replies, in confidence, to Managing Director, Transformers (Watford) Ltd., Sandown Road, Watford, Herts. (F 235)

TRANSFORMER DRAUGHTSMEN required with some experience on units in the range 500 to 10,000 kVA. Salary according to qualifications.—Apply Technical Director, Bryce Electric Construction Co., Ltd., Kelvin Works, Hackbridge, Surrey. (F 138)

WELL-KNOWN Shipping Company require for their Engineering Staff a CHIEF ELECTRICAL ENGINEER. Applicant must be between 25 and 38 years of age and have had practical and theoretical training in Electrical Engineering and Workshop practice, preferably holding a University Degree. Practical experience should include specifying and layout of electrical equipment, as fitted in modern ocean liners a.c. and d.c. Eligible superannuation scheme.—State salary required to Box No. 2931, Electrical Times. (F 208)

YOUNG ENGINEERS who have a knowledge of Power Transformers and H.N.C. electrical are invited to apply for sales and contracts positions with English Electric at Stafford. Training may be given to suitable candidates.—Write quoting ref. 336H to Dept. C.P.S., 336/7 Strand, London W.C.2. (F 101)

APPOINTMENTS WANTED

M.P.O.A., M.P.I.M. EXECUTIVE, age 39 years, with wide buying production, personnel and administrative experience, seeks change of appointment, preferably as manager. Power transformer and electrical engineering background. Present salary £750 per annum; present company 15 years.—Box No. 2891, Electrical Times. (F 96)

WORK WANTED

A.C. and d.c. MOTOR REWINDS and REPAIRS. Prompt service fully guaranteed. Edgware 5566 (4 lines).—Service Electric Co., Ltd., Stanmore, Middx. (F 13)

ARMATURE REWINDING service to the trade. Vacuums, Drills, Grinders, Hood Dryers, Dental Motors, Vacuum cleaner and drill armatures replaced from stock. 24-hour service. Every job guaranteed. All vacuum cleaner parts, hoses, etc., in stock for any make. Apex washer agitator shafts stocked.—Regam Electric Cleaner Service, 95 Park Lane, Leeds 1. (F 22)

CAPACITY AVAILABLE, turning, drilling, milling, canstans, jigs and fixtures, gauges.—W. A. Smith and Co., 851 Harrow Road, London N.W.10. (F 241)

FISHER FOUNDRIES, LTD., Greet, Birmingham, have immediate capacity for machine moulded PRECISION CASTINGS in gunmetal and grey iron, ¼ to 30 lb. All castings shot blasted.—Telephone: Birmingham, Victoria 0197. (F 16)

MOTOR REPAIRS and REWINDS to the trade, prompt guaranteed service, f.h.p. to 10 h.p. Spec. frig. motors. Collect and deliver in London.—H. J. Musgan Ltd., Pad. 5210 and 2967. (F 237)

WORK WANTED. Capacity available for all types of COIL WINDING.—Box No. 2425, Electrical Times. (F 17)

WANTED

A.C.-D.C. MOTORS, STARTERS, complete change-over installations, etc.—A.A. Electrical Co., Ltd., 67 Rothschild Road, Chiswick Park, W.4. Tel.: Chiswick 5105. (F 8)

WANTED, D.C. and A.C. ball-bearing MOTORS, MOTOR GENERATOR SETS, DYNAMOS and ALTERNATORS.—Full details to Britannia Manufacturing Co., Ltd., 22-26 Britannia Walk, London N.1. (F 4)

WANTED, for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper, Ltd., 176 Brady Street, Bethnal Green, E.1. (F 1)

WANTED. Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock water-tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox water-tube boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath, Staffs. (F 2)

WANTED, ROTARY CONVERTERS, any size.—Universal, 221 City Road, London E.C.1. (F 6)

FOR SALE

ENGINEERING PLANT & MATERIALS

B.M.S. BARS, CHEAP. 5/32 in., 1¼ tons; 0·120 in., 5 cwt.; ¼ in., 1 ton; 9/32 in., 2 tons; 21/64 in., 2 tons; 11/32 in., 6 tons. 5/32 in. LEDLOY, 2 tons. ¼ in. EN 32 M. ½ ton. 7/16 in. B.M.S., 2 tons. 16 and 18 g FLAT GAL. SHEETS.—Dyas and Fowle, 41 Loudon Road, N.W.8. MAI. 5469. (F 193)

GENERATING PLANT

FOR SALE, GENERATING SET, comprising Petter TX3 diesel engine, 108 h.p., 500 r.p.m. with all auxiliaries: Petter SS3 diesel engine, 185 h.p., 500 r.p.m., with all auxiliaries; Laurence Scott 10 kW 110 V. 1,500 r.p.m. d.c. generator, complete with switchboard.—C. W. Pittard and Co., Ltd., Sherborne Road, Yeovil. (F 63)

FOR SALE. 19 h.p. Lister diesel GENERATING SET, direct coupled 10 kW generator in good order, complete, £150. Bargain to clear, one 12 h.p. 220 d.c. GENERATOR, Thomson-Houston, complete with starter, £30. One 0·75 h.p. 220 d.c. MOTOR, by Ashton, and starter, overhauled, £30. One 2½ h.p. 220 d.c. MOTOR, by Siemens, and starter, overhauled, £30. Will sell separately.—Apply, Wallasea Bay Yacht Station Ltd., near Rochford, Essex. (Tel.: Canewdon 223). (F 203)

120 B.H.P. National heavy OIL ENGINE. Complete with cooling and storage tanks. F. type petrol/paraffin engine, compressor and air receiver. Numerous spare parts, almost new condition, available September. Further information and appointment to inspect under working conditions, write: Webb, Jarratt and Co., Ltd., Chesham, Bucks. (F 223)

STEAM-DRIVEN GENERATING SETS.

665 kVA (500 kW), steam-driven ALTERNATOR SET by BELLISS AND MORCOM/SIEMENS, for 5,000/3/50, 77 amps. Steam pressure 150/155 lb. Speed 333 r.p.m.

625 kVA (500 kW), Steam ALTERNATOR SET by BROWETT LINDLEY/L.D.C., for 400/440/3/50, 4 wire, with 230/250 V line to neutral. Speed 333 r.p.m. Steam pressure 165 lb. sq. in., against 15 lb. back pressure. Makers advise would operate with steam at 180 lb. sq. in., against 20 lb. back pressure.

Two 420/470 kVA steam ALTERNATOR SETS by BELLISS AND MORCOM/MATHER AND PLATT, for 400/440/3/50. Speed 375 r.p.m. Steam pressure 150 lb. sq. in., against 15/20 lb. gauge back pressure.

313 kVA (250 kW) steam ALTERNATOR SET by BROWETT LINDLEY/BRITISH WESTINGHOUSE for 430/3/50, 4 wire. Steam pressure 100 lb. sq. in., 5 lb. back pressure, or up to 140 lb. sq. in., exhausting to 15 lb.

250 kW steam driven GENERATING SET by ASHWORTH AND PARKER/MET-VICK for 115 V d.c. Steam pressure 120 lb. sq. in., exhausting to 26 in. vacuum Speed 400 r.p.m.

250 kW geared turbo GENERATOR SET by BELLISS AND MORCOM/CROMPTOM PARKINSON, for 207/230 V d.c. Speed 1,000 r.p.m. through reduction gear. Multi-stage turbine designed for steam at 290 lb., 550° F. superheat, plus 25% overload for two hours when running at 6,000 r.p.m.

250 kVA steam driven ALTERNATOR SET by BELLISS AND MORCOM/HARLAND for 400/3/50, 360 amps., 0·8 p.f. Steam pressure 140 lb., 12 lb. back pressure.

240 kW Turbo ALTERNATOR SET by W. H. ALLEN/L.D.M., for 400/3/50. Speed 600 r.p.m. through reduction gear. Steam pressure 150 lb. sq. in., 5 lb. back pressure, or alternatively 200 lb. sq. in., 15 lb. back pressure.

Two 187½ kVA steam driven ALTERNATOR SETS by BROWETT LINDLEY/BRUCE PEEBLES, for 400/3/50, 4 wire. Speed 428 r.p.m. Designed for use with steam at 180 lb., exhausting against 7½ lb. back pressure, utilising steam superheated 150°.

150 kW steam engine driven ALTERNATOR SET by BELLISS AND MORCOM/HARLAND ENGINEERING, for 400/3/50, speed 428 r.p.m. Steam pressure 150 lb., 460/500° F. superheat.

George Cohen, Sons & Co., Ltd., Wood Lane, London, W.12. Tel.: Shepherds Bush 2070, and Stanningley, nr. Leeds. Tel.: Pudsey 2241. (F 222)

LIGHTING EQUIPMENT

PURLEY CHOKES AND BALLASTS. Our 80-W tapped h.p.f. ballast with starter switchgear-holder, incorporated, is proving itself the most popular unit. Suitable for most fittings 57s. 6d. each subject.—F. W. Blansbard Ltd. (Dept. E.T.), Purley, Surrey. Uplands 4218-9. (F 14)

METERS

A.C.-D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, London, N.W.4. (F 5)

HOUSE-SERVICE METERS, a.c. or d.c., quarterly or prepayment.—Universal Electrical, 221 City Road, London E.C.1. (F 10)

METERS. A.c. and d.c., new and reconditioned, all types. Quarterly, single and three phase, 3 and 4 wire, 2½ to 1,000 amps. Prepayment, single and double tariff, single, dual and triple coin, fixed and variable tariff, 2½ to 50 amps. M.D.I. Billiards Switches, Rent Collectors. Prices from 5s. carriage paid. Guaranteed for ever. Immediate delivery.—Illustrated catalogue from The Electric Meter Co., Dept. 46, Castle Circus House, Torquay. (F 199)

MOTORS & STARTERS

A.A. ELECTRICAL CO. for A.C.-D.C. MOTORS, SWITCHGEAR, EXHAUST FANS, HOISTS, REDUCTION GEARS, new or reconditioned units.—Chiswick 5105, Chiswick 5605, 67 Rothschild Road, W.4. (F 7)

FLAMEPROOF MOTORS, M.G. SETS, D.C. MOTORS, GEARED MOTORS, A.C. MOTORS, TRANSFORMERS, CONTROL GEAR. SPECIALS. FLANGE MOTORS.

ELECTROPOWER COMPANY LIMITED

Kingsbury Works, Kingsbury Road, London, N.W.9.
Tel.: COLindale 4621/3.
Grams: Lektropowa, Hyde, London. (F 12p)

A.C. and D.C. MOTORS, all sizes, large stocks. Fully guaranteed.—Milo Engineering Works, Ltd., Milo Road, East Dulwich, S.E.22. (Forest Hill 2278-9.) (F,3)

A.C. and D.C. MOTORS, GENERATORS from stock.—Service Electric Co., Ltd., Honeypot Lane, Stanmore, Middx. Edgware 5566-9. (F 9)

FLAMEPROOF Group II s/cage MOTORS. 400 V, 3 phase, 50 c/s supply.
2—Mather and Platt, 35 h.p., 750 r.p.m.
3—B. Peebles, 25 h.p., 3,000 r.p.m.
1—E. Electric, 9 h.p., 1,000 r.p.m.
1—E.P.E., 5 h.p., 1,500 r.p.m.
2—Brook, 5 h.p., 3,000 r.p.m.
17—E. Electric, 3·75 h.p., 1,500 r.p.m.
2—L. D. and C., 1·5 h.p., 3,000 r.p.m.
Apply: Whitefield Machinery and Plant Ltd., Cobden Street, Pendleton, Salford, 6. (F 185)

SWITCHGEAR

MERCURY SWITCHES are made by Hall, Drysdale and Co., Ltd., of 58 Commerce Road, Wood Green, London N.22. Tel.: BOW. 7221. (F 11)

TIME SWITCHES for sale. Reconditioned or new, 12 months' guarantee. Immediate delivery.—Lists from J. W. Hughes, 3 St. Thomas' Street, London Bridge, S.E.1. (Tel.: HOP. 2758.) (F 23)

TRANSFORMERS & CONVERTERS

HACKBRIDGE AND HEWITTIC MERCURY-ARC RECTIFIERS for operation on standard voltage 3-phase 50 c/s supply line.
1—460 kW 230 V d.c. output.
1—150 kW 230 V d.c. output.
1—126 kW 420 V d.c. output.
1—80 kW 400 V d.c. output.
1—75 kW 220 V d.c. output.
1—75 kW 220-0-220 V d.c. output.
1—65 kW 110 V d.c. output.
1—15 kW 220 V d.c. output.
Apply: Whitefield Machinery and Plant Ltd., Cobden Street, Pendleton, Salford 6. (F 186)

UNCLASSIFIED

A HIGH VACUUM IMPREGNATION UNIT or single or batch coil impregnation service to B.I.C. Specification 214 or individual requirements.—Blickvac, 505 Lordship Lane, S.E.22. Tel.: Forest Hill 7089. (F 18)

VITREOUS STEEL NOTICE PLATES complying with I.E.E. regulations. "Danger—High Voltage," 6 in. by 2 in., 1/3 each. "Lock Switch," etc., 6 in. by 4 in., 1/8 each. "Fire Switch," 6 in. by 4 in., 1/5 each "Fire Switch" (with name and address), subject to uantity. "I.E.E. Inspection Notice," 1/4 each. Foicik Ltd., 36-38 Western Road, Plaistow, London E.13. (Tel.: GRA.4524.) (F 187)

300 KVA Hackbridge TRANSFORMER, 6,000-400 V rector, Group 41DY3.
50 kVA English Electric TRANSFORMER, 33,000-415 V, 3-phase, 50 c/s, Rector Group 41DY11.
Crompton T.A.P. oil immersed BREAKERS.
½ h.p. and ¾ h.p. 110 V d.c. ELECTRIC MOTORS.
H. B. Barnard and Sons, Ltd., Dudley Port, Tipton, Staffs. (F 236)

MISCELLANEOUS

CITY AND GUILDS (Electrical, etc.) on "No Pass—No Fee" terms. Over 95 per cent. successes.—For full details of modern courses in all branches of Electrical Technology send for our 144-page handbook FREE and post free.—B.I.E.T. (Dept. 39), 17 Stratford Place, London W.1. (F 15)

FREE! Brochure giving details of courses in ELECTRICAL ENGINEERING and ELECTRONICS, covering A.M.Brit.I.R.E., City and Guilds, etc. Train with the Postal Training College, operated by an Industrial Organisation. Moderate fees.—E.M.I. Institutes, Postal Division, Dept. ET. 29, 43 Grove Park Road, London W.4 (Associate of H.M.V.). (F 21)

THE PROPRIETOR of British Patent No. 636105, entitled "IMPROVEMENTS IN CURRENT LIMITER FOR ELECTRICALLY DRIVEN MACHINE TOOLS," offers same for license or otherwise to ensure its practical working in Great Britain.—Inquiries to Singer, Stern and Carlberg, Chrysler Building, New York 17, N.Y., U.S.A. (F 200)

LONG-LIFE WIRE FOR THERMO-COUPLES

T1/T2

THERE ARE few makers of base-metal thermo-couple material for high-temperature work, simply because these alloys are difficult to manufacture.

The well-known material formerly imported is in every respect matched by our home-produced alloys **T1** (nickel-chromium) and **T2** (nickel-aluminium), developed to give long life at temperatures up to 1100° C.

T1/T2, having the same thermal EMF values, can be substituted without recalibration of instruments.

Advance

WITHIN its range of working, the special **Advance** is popular because of its high EMF and relatively low price.

This home-produced nickel-copper alloy is used in combination with copper for thermo-couples operating up to 500° C, and with iron for thermo-couples operating up to 900° C.

Special **Advance** is supplied to users' individual EMF requirements and can be relied upon to give long-life service.

Data on request.

BRITISH DRIVER-HARRIS CO. LTD.
MANCHESTER 15

Thermo-couple material is but one section of our specialist service in nickel and nickel-alloys. May we send a copy of our Data Book?

THE GREATEST NAME IN "NICHROME" ELECTRICAL RESISTANCE

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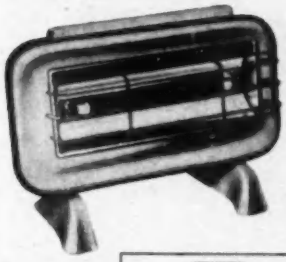

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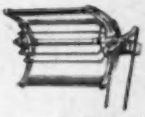

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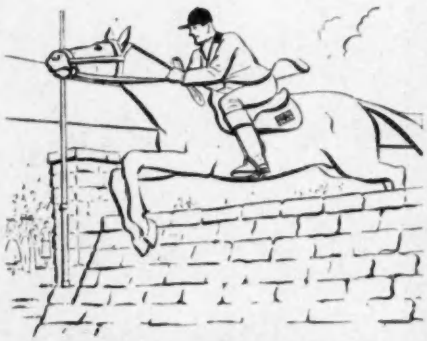

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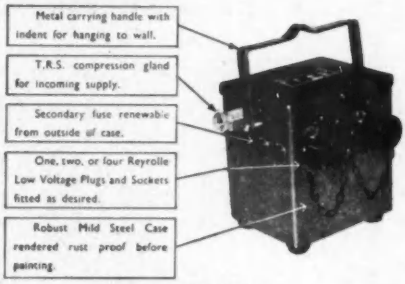
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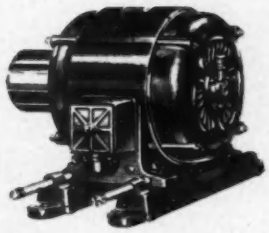

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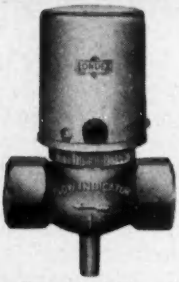

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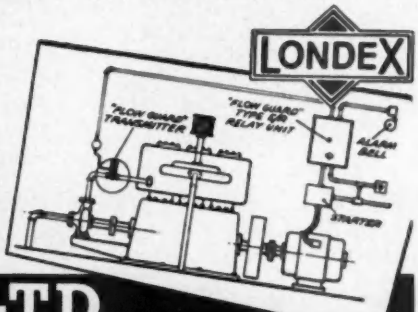

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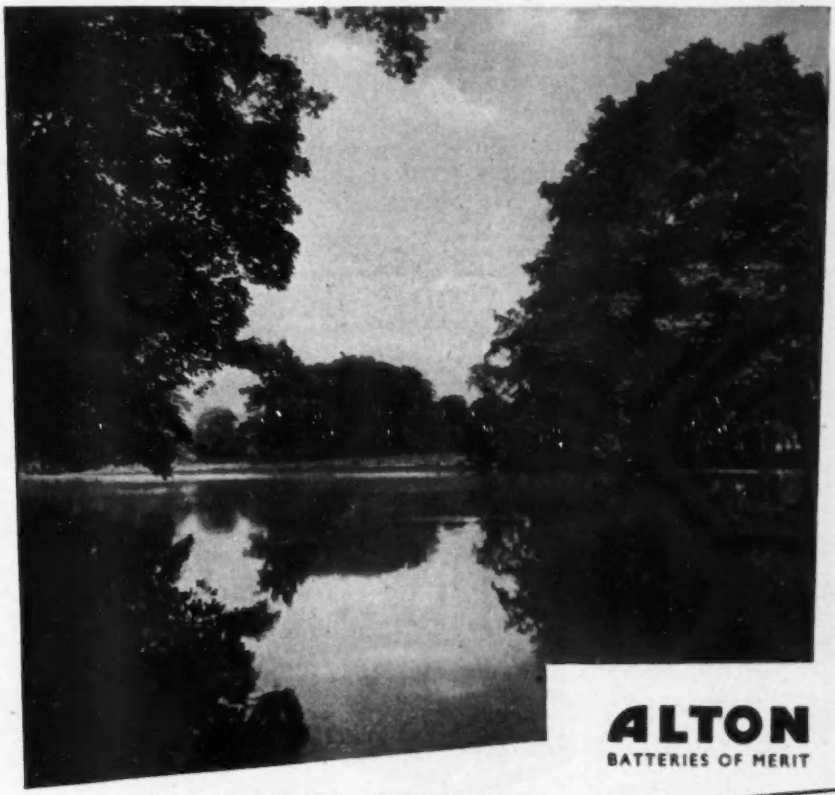

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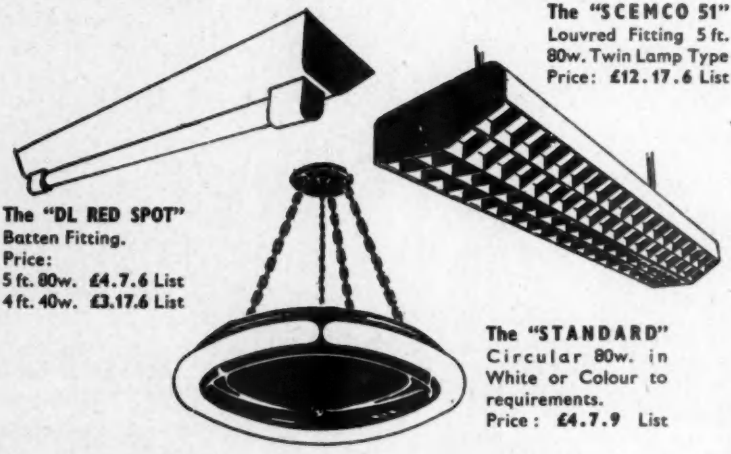

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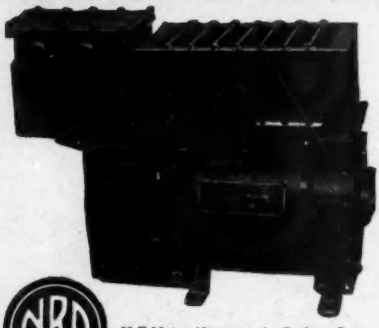

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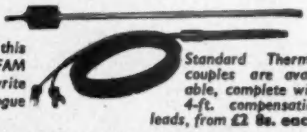

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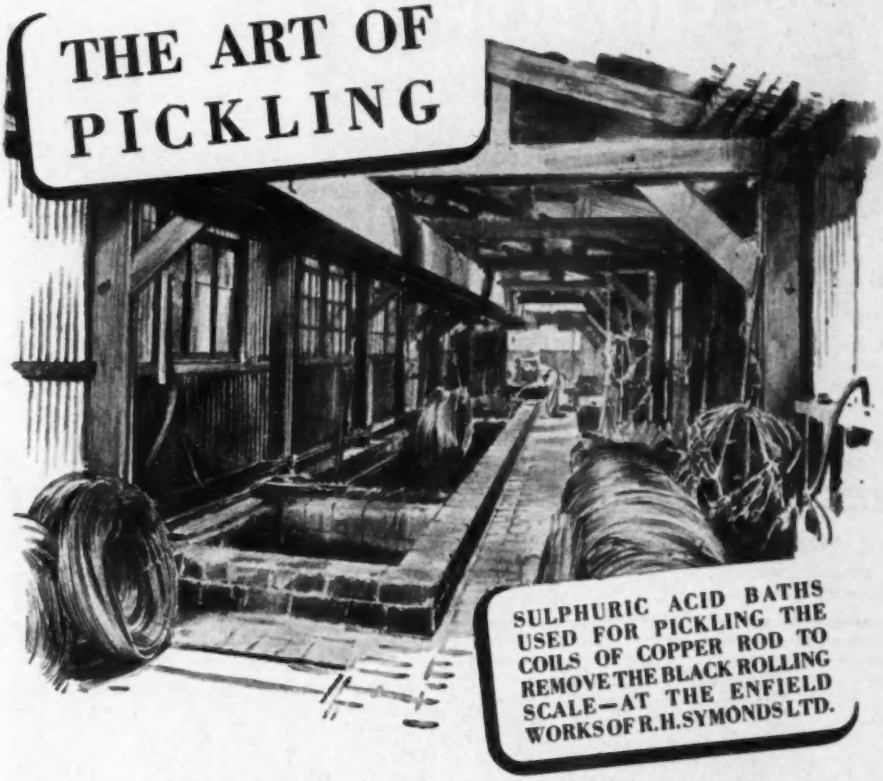

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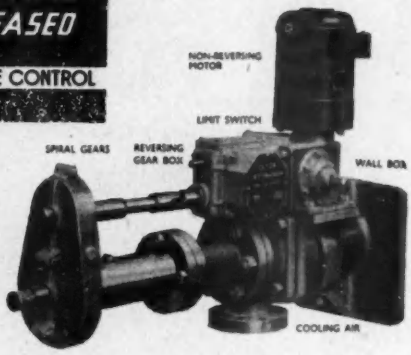

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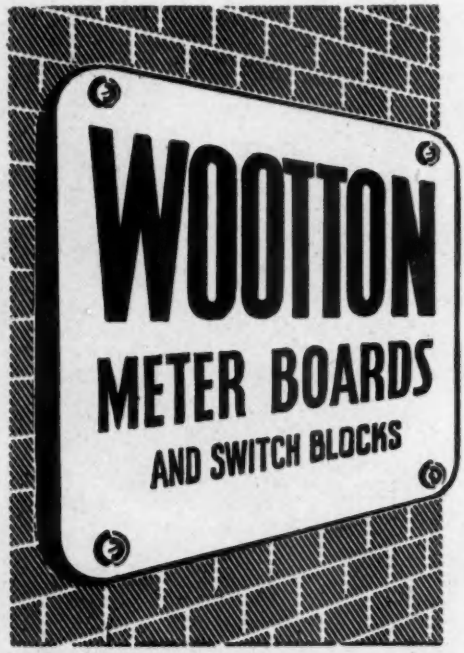

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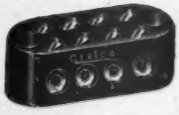

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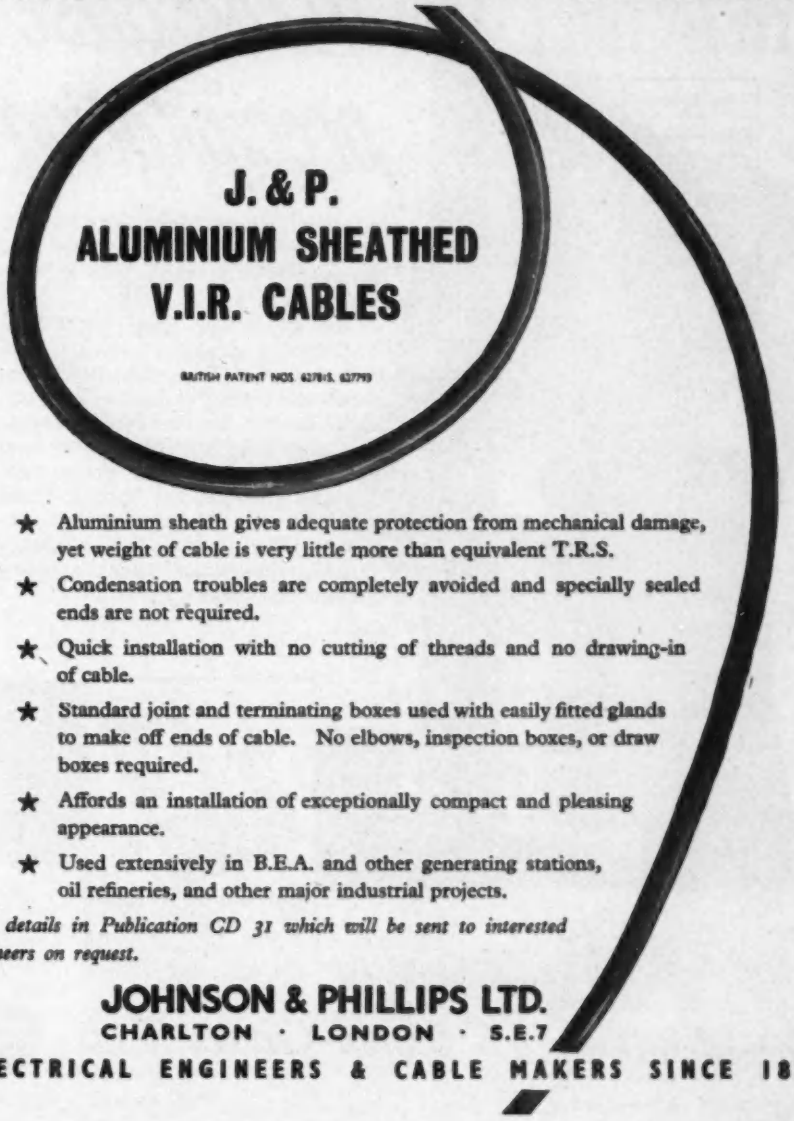

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Printed in England for the Proprietors, THE ELECTRICAL TIMES, LTD., by SUN PRINTERS, LTD., London and Watford, Herts, and published at Sardinia House, Sardinia Street, London W.C.2. September 24, 1953

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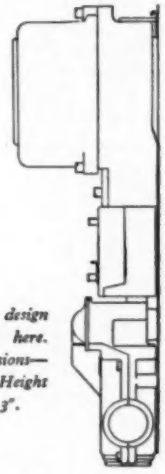

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